



# MARYLAND DEPARTMENT OF THE ENVIRONMENT

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January 31, 2013

Michael Blackmon, PE, CHMM  
Environmental Engineer/Environmental Management Group Leader  
National Institute of Standards and Technology  
Building 223, Room A305, MS1730  
100 Bureau Drive, Gaithersburg, MD 20899-1730

Re: Rockville Launch (W-92) 770 Muddy Branch Road, Gaithersburg, Maryland

Dear Mr. Blackmon:

The Maryland Department of the Environment (MDE) has completed its Expanded Site Inspection of the Rockville Nike Launch property located at 770 Muddy Branch Road, Gaithersburg, Montgomery County, Maryland.

A copy of the ESI report is included for your reference. If you have any questions concerning this project, please contact me at (410) 537-3449.

Sincerely,

Alex M. Cox, Geologist

Federal assessment and Remediation Division

AMC:amc

Enclosure

cc: Mr. Horacio Tablada  
Mr. James Carroll  
Ms. Peggy Williams





**Site Inspection  
Rockville Launch Site  
Gaithersburg, Montgomery County, MD  
(MD-226)**



April 4, 2012

Prepared by: Maryland Department of the Environment  
Land Management Administration  
1800 Washington Blvd.  
Baltimore, MD 21230

Prepared for: U.S. Environmental Protection Agency  
Region III  
1650 Arch Street  
Philadelphia, PA 19103-2029





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## **1.0 Introduction**

### **1.1 Authorization**

This Formerly Used Defense Site (FUDS) Site Inspection (SI) was conducted by the Maryland Department of the Environment, Land Management Administration, Land Restoration Program (MDE) under a Cooperative Agreement with the U.S. Environmental Protection Agency (EPA) using the authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA).

### **1.2 Scope of Work**

MDE's Controlled Hazardous Substances (CHS) Enforcement Division conducted this SI of the Rockville Nike Launch Site in accordance with a cooperative agreement with the EPA. The objective of this investigation was to collect information concerning conditions at the Nike site sufficient to determine the presence or absence of human health and/or environmental hazards at the site and to determine whether further environmental actions at the site are warranted. This SI is not designed to determine the lateral or vertical extent or all locations and types of environmental hazards at the site.

The scope of the SI involves conducting a historical site review to determine past activities and processes that are potential sources of contamination. Furthermore, it involves a review of currently available regulatory records relating to the property and vicinity to identify documented releases of chemicals and determine past operating practices in handling hazardous substances and wastes related to site operations.

### **1.3 Executive Summary**

The Rockville Nike Launch Facility operated from 1955 through 1974 at the location off Muddy Branch Road near Gaithersburg, Montgomery County, Maryland. This report references the site as Rockville W-92. Following base closure in 1974, the site was turned over to the Consumer Product Safety Commission and later, to the National Institute of Standards and Technology (NIST). Currently, the Nike launch site is owned by the U.S. Federal Government.

The United States Army Corps of Engineers (USACE) has investigated the site under the formerly used defense site (FUDS) initiative. Portions of the site were remediated under USACE oversight. Monitoring well sampling at the Rockville Launch site revealed levels of chlorinated solvents greater than the maximum contaminant level (MCL) in on-site monitoring wells. Samples of site soils found elevated levels of metals and petroleum hydrocarbons in some on site locations. Copper (202 ppm), lead (126 ppm) and zinc (270 ppm) were identified at levels significantly greater than three times their background level. Methylene chloride (25 ppb) was identified in site soils at levels above the regional screening level (RSL) for non-residential soils. Petroleum hydrocarbons (1100 ppm) were identified at a level greater than the MDE clean-up standard.

## 2.0 Site Description

The NIKE missile launch site is a testament to the Cold War era. "Rockville W-92" was a guided missile base installed to help defend the Nation's Capital from enemy bombers. Built in 1954, the missile launch site located west of Muddy Branch Road, housed both NIKE Ajax and Hercules missiles. The launch site contains three missile silos and a collection of barracks and out-buildings. The Nike site remained operational until 1974, when rendered obsolete by the refinement of intercontinental ballistic missiles.

In the early years of the Cold War, the United States Army set up a battery of Nike missile defense systems around forty major US cities. The typical Nike base consisted of two operational areas: the launch area and the fire control area. The launch area contained the facilities and equipment required to assemble, test and maintain the missiles and associated launch mechanisms. The fire control area, located on MD-RT 28 about 1-mile from the launch area, consisted of radar and telemetry arrays and a command area that initiated launch and controlled the flight of the missile. This report deals exclusively with the launch area.

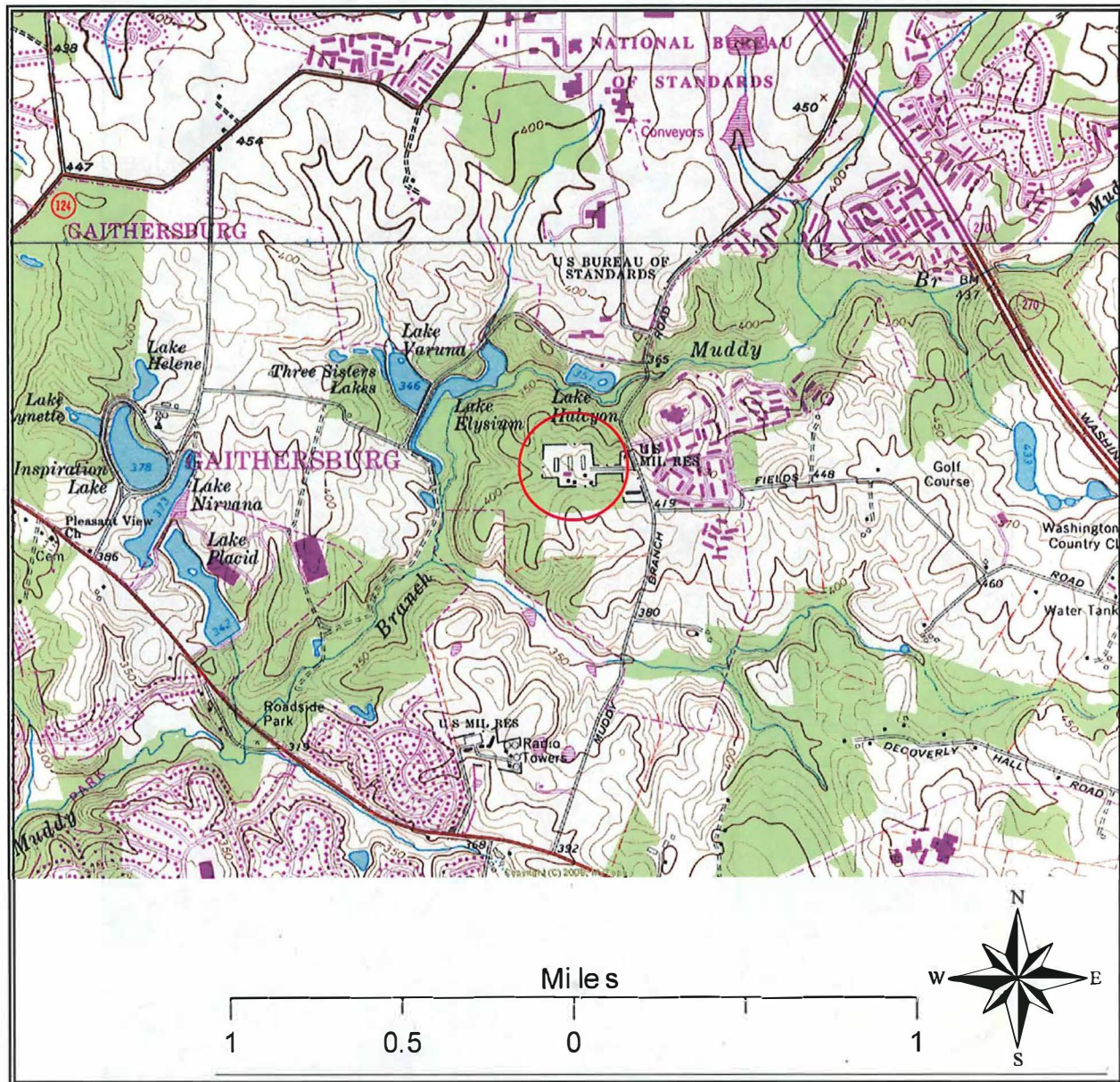
Normal operations at a Nike launch facility included the use and on-site disposal of solvents, fuels, battery acids, hydraulic fluids, paints and other materials necessary to support the mission. Contaminants normally associated with a Nike launch site include petroleum compounds, carbon tetrachloride and associated degreasing agents, red fuming nitric acid, lead based paints, asbestos containing materials, polychlorinated biphenyls, pesticides and heavy metals.

There are generally several underground storage tanks (UST) and at least two dry wells normally associated with a Nike Launch facility. At the Rockville site there were three USTs and two dry wells. The USTs were located behind the barracks building, the missile assembly building and the machine shop. One dry well was associated with the rocket cleaning and assembly building and a second dry well was associated with the rocket fueling facility. Waste from the cleaning and assembly building included chlorinated solvents, such as TCE and carbon tetrachloride, as well as petroleum compounds and associated degreasing agents. Wastes associated with the fueling operations included red fuming nitric acid and solid fuel propellants.

The address for Rockville Launch (MD-226) was 770 Muddy Branch Road, Gaithersburg, MD 20878. The geographic coordinates for the site are 039 degrees 7 minutes 00.72 seconds north latitude by 077 degrees 13 minutes 11.43 seconds east longitude. The Maryland grid coordinates are 467,000 north by 738,000 east. Figure 1 outlines the site location on a 7.5 minute quadrangle map for the area. The location of the site relative to Rockville and Gaithersburg is shown on Figure 2. Figure 3 shows a recent aerial photograph of the site.



Figure 1 – Topographic Map of Area





**Figure 2: Location of Rockville Launch Site**





**Figure 3: Aerial Photo of Launch Site**



## 2.1 Site Ownership and Historical Site Use

The parcel that includes the site of the Rockville Nike Launch is listed in the Maryland Department of Assessment and Taxation as Parcel 322 on Map FS32 in Montgomery County, Maryland. Property records for the site have been traced back to 1728 when it was part of the Wickham's Goodwill land grant (Table 1).

Between 1955 and 1956 the United States Government obtained the 13.71 acre parcel in a taking action on "Wickhams Goodwill". The Nike Launch facility was constructed in the period between 1955 and 1956. The site was owned and operated by the Department of the Army from 1956 to 1962, at which time it was transferred to the Department of the Navy. The site was transferred two more times, to Harry Diamond Laboratories in 1972, and then to Fort George G. Meade in 1979. In 1986, the site became the Army Reserve Center after operations were moved there from the Control Area. Following base closure in 1974, the Consumer Product Safety Commission and later, the National Institute of Standards and Technology conducted operations on the site as tenants of the U.S. Government. Currently, the NIKE launch site is owned by the U.S. Federal Government and is under the control of NIST. The latest property map for the area is included as Figure 4.

**Table 1: Property Records**

Date	Grantor	Grantee
1986	Fort George G. Meade	US Army Reserves
1979	Harry Diamond Laboratories	Fort George G. Meade
1972	Department of the Navy	Harry Diamond Laboratories
1962	Department of the Army	Department of the Navy
1956	Taking "Wickham's Goodwill"	Department of the Army
1920	Ann Virginia Plummer	Alice V. Plummer
1828	James Plummer's Heirs	Ann Virginia Plummer
1793	James Plummer	James Plummer's Heirs
1728	Land Grant "Wickhams Goodwill"	James Plummer





## **2.2 Permitting and Regulatory Actions**

There are no records of any regulatory actions against the Rockville Nike Site.

There are no records of environmental permits being issued for the Nike launch site or for any operations that followed closure of the Nike base.

## **2.3 Previous Investigations and Remedial Actions**

The Rockville Nike Launch site has been the subject of several previous investigations including:

- In September 1988, Woodward-Clyde Consultants (WCC) conducted a Confirmation Study at the site. The results of this study identified the presence of trichloroethene (TCE) in the sample collected from groundwater monitoring well MW-4 at a concentration of 0.021 milligrams per liter (mg/L). In addition, elevated total petroleum hydrocarbons (TPH) (1,100 milligrams per kilogram [mg/kg]) and elevated metals (copper, lead, nickel, zinc, and magnesium) were identified in the soils on the northwest portion of the site. The elevated metals concentrations were attributed to the presence of paint chips and other debris that was noted in the soil sample. The report recommended the removal of three USTs from the site.
- EA Engineering and Science, Inc. (EA) conducted a site investigation on December 27, 1989, which found that the three USTs were removed by the property owner, NIST.
- In 1994 the USACE, Omaha District, completed a limited groundwater investigation. Results of this investigation identified the presence of TCE in the sample collected from MW-4 at a concentration of 0.017 mg/L.
- In September 1997 USACE performed a DERP Inventory Screening to Determine DOD responsibility for environmental and safety conditions at the former Nike missile battery.
- On October 31, 2000, the United States Environmental Protection Agency (USEPA), Superfund Technical Assessment and Response Team (START) collected groundwater and soil samples from across the site. Results of this investigation identified the presence of TCE in the sample collected from MW-4 at a concentration of 0.0008 mg/L. However, it was noted that several of the sample bottles contained bubbles and that these bubbles may have been caused by a reaction between the water sample, sediment in the sample, and the sample preservative. The report noted that the detected concentration in the sample collected from MW-4 may not accurately reflect the true concentration of TCE at this monitoring well. Soil samples were also collected from the northwest portion of the site by the USACE as part of this investigation and analyzed for TPH and lead. TPH was not detected in any of the samples, and lead was reported to have been detected within the natural limits for lead in soils in the eastern part of the United States. Furthermore,



one of the samples was also analyzed for leachable lead per the toxicity characteristics leaching procedure (TCLP). The results of the TCLP lead analysis indicated that the concentration of leachable lead in the soils was below the current regulatory value of 5 mg/L.

- In 2001 DOD recommended further on and off site monitoring to define the groundwater plume.
- In September 2002, the USACE Baltimore District collected a groundwater sample from monitoring well MW-4 to confirm that the TCE concentration was below the MDE Maximum Contaminant Level (MCL) of 0.005 mg/L. The analytical results for this sampling event indicated that no TCE was detected in the sample at or above the laboratory detection limit of 0.0014 mg/L.
- In November 2007 ARM Group, Inc. performed a Site Characterization and Risk Assessment on the site for the town of Gaithersburg. The soil gas investigation identified TCE at levels above the EPA Vapor Intrusion Guidance Criteria of 2.2 ug/m<sup>3</sup> in three of five samples. Two of these were sub-slab and one was through a paved surface. Wipe samples from the missile silos detected PCBs above detection limits. The report also documents a July 2007 investigation that confirmed no TCE contamination in MW-4. As a result of this investigation USACE abandoned MW-2, MW-3 and MW-4.
- In March 2008 ARM Group, Inc. performed indoor air sampling on the site for the town of Gaithersburg. Two indoor ambient air and two sub-slab soil gas samples were collected. ARM concluded that the VOCs found in soil do not present an unacceptable hazard. Contaminants found in ambient indoor samples were not at levels significantly above EPA's indoor air screening levels.

**Figure 5: Location of Former Monitoring Wells**



### **3.0 Environmental Setting**

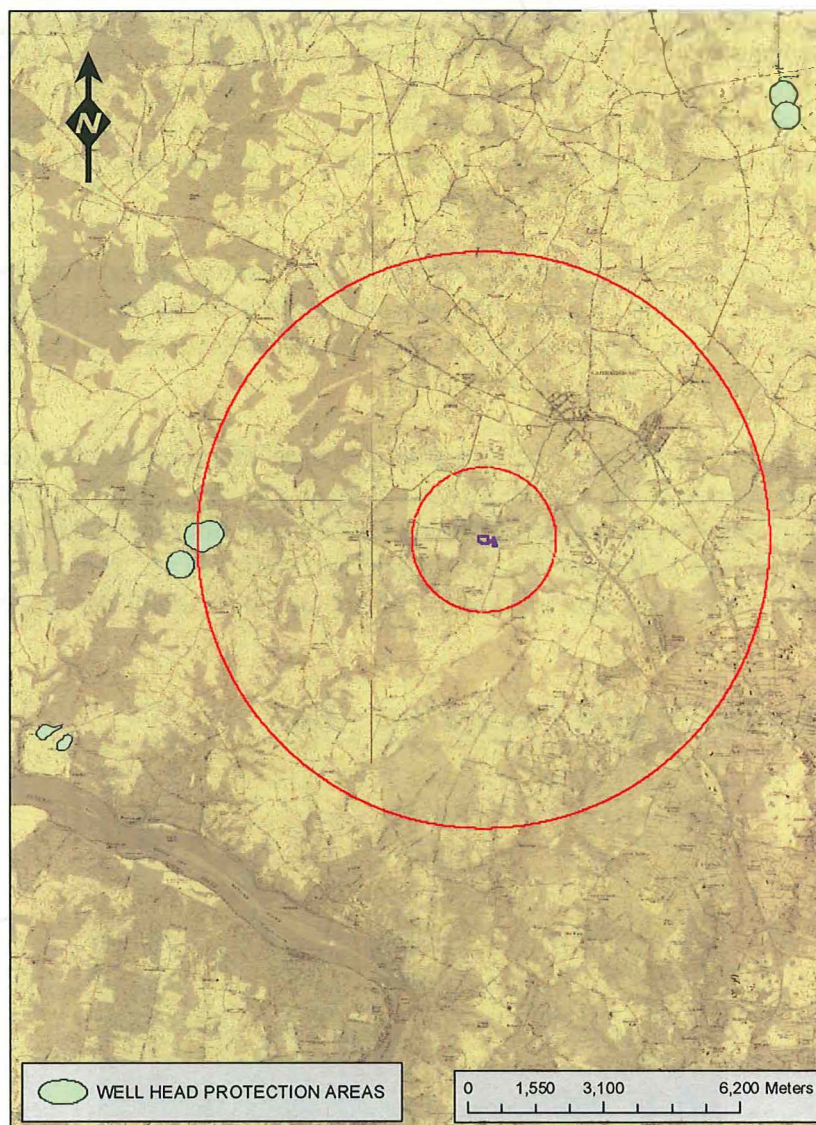
The pathways addressed in the site are groundwater, surface water, soil and air. Targets are physical or environmental receptors that are within the target distance limit for the pathway. A primary target is designated as one with a high likelihood of exposure to a hazardous substance and a secondary target is designated as one with a relatively low likelihood of exposure to a hazardous substance.

#### **3.1 Water Supply**

The groundwater pathway assessment addresses hazardous substance migration to and within aquifers and potential threats to targets such as drinking water supplies. The target population is the human population associated with the site and/or its targets. The target distance limit for groundwater is a four-mile radius around the site.

The majority of the population within a four-mile radius of the launch facility relies on water drawn from the Potomac River. There are no domestic drinking water wells within ½ mile of the site. There is one domestic well listed in the MDE Well Database within the one-half to one-mile ring of the site. The database lists it as being located off Quince Orchard Road just west of the Rockville Launch. There are 340 domestic wells within four miles of the site (Table 2). There is a well head protection area (WHPA) west of the launch site, but it is at the outer limits of the four mile radius ring around the site and not likely to be impacted by the site (Figure 6).



**Figure 6: Well Head Protection Areas at Launch Site****Table 2: Wells within Four-Mile Radius**

Distance from Site	Well Use				Total
	Domestic	Farm	Industrial	Public	
0 to 1/2 Mile	0	1	1	0	2
1/2 to 1 Mile	0	0	0	0	0
1 to 2 Miles	43	1	4	0	48
2 to 3 Miles	209	2	8	0	219
3 to 4 Miles	88	1	2	0	91
Total	340	5	15	0	361

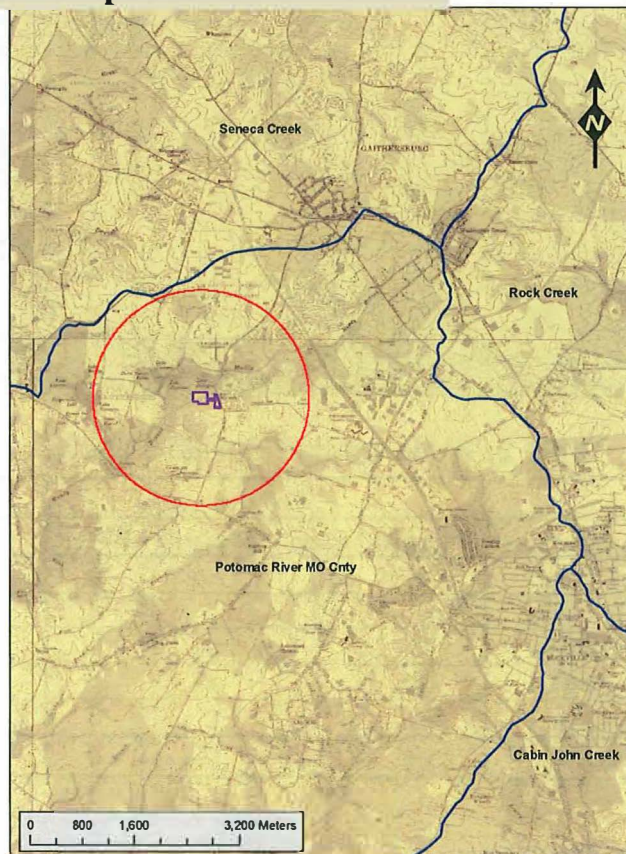
### 3.2 Surface Water

The surface water pathway addresses hazardous substance migration to surface water bodies, drinking water supplies, the human food chain and sensitive environments. The target population consists of those people who use surface water for drinking water or consume food chain species from target fisheries. The target distance limit for the surface water pathway is 15 miles downstream from the probable point of entry (PPE). The Potomac River is used for recreational and commercial fishing in the area.

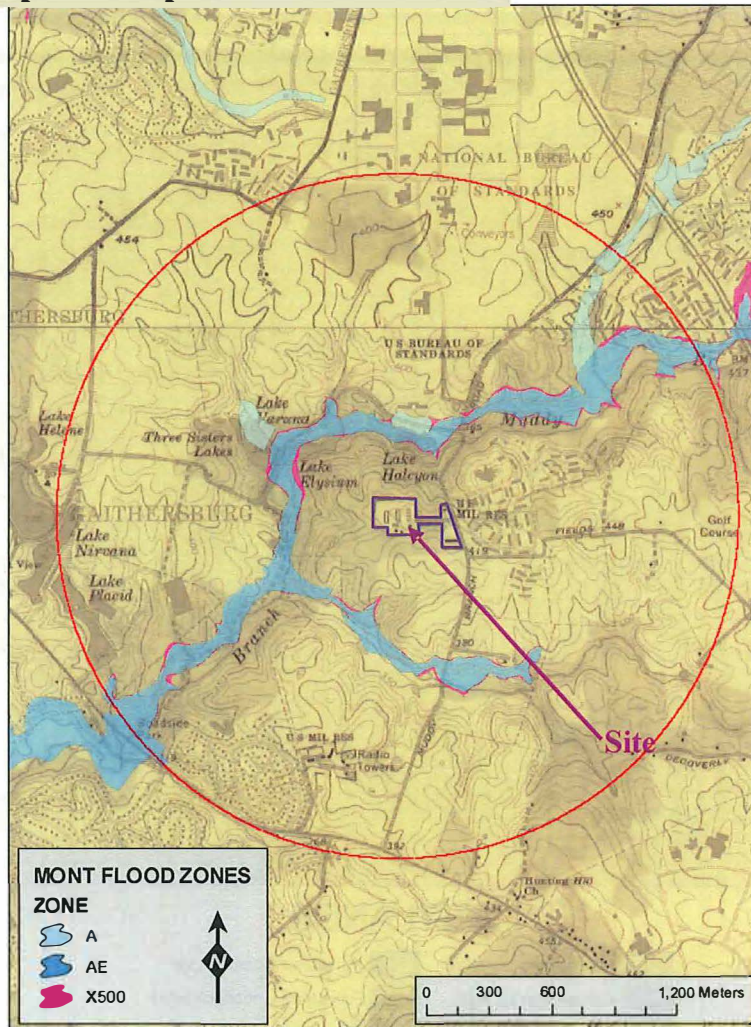
The site is located on Muddy Branch Creek in the Potomac River Montgomery County Drainage Basin (Figure 7). The 15-mile surface water target distance limit (TDL) from the PPE flows through Muddy Branch Creek to a point in the Potomac River just off of Watkins Island. There are two surface water intakes within the TDL.

The site is located in a high relief topographical area characterized as a deep stream valley. The site lies outside of the 100-year flood plain (Figure 8). Area floodplain and wetlands are confined to the immediate area around Muddy Branch and other tributaries feeding the Potomac River. In the area of the site the flood plain and wetlands are limited to the man-made ponds and the banks of the creek and tributaries. There are no wetlands associated with the site (Figure 9).

**Figure 7: Watershed Map of Launch Site Area**

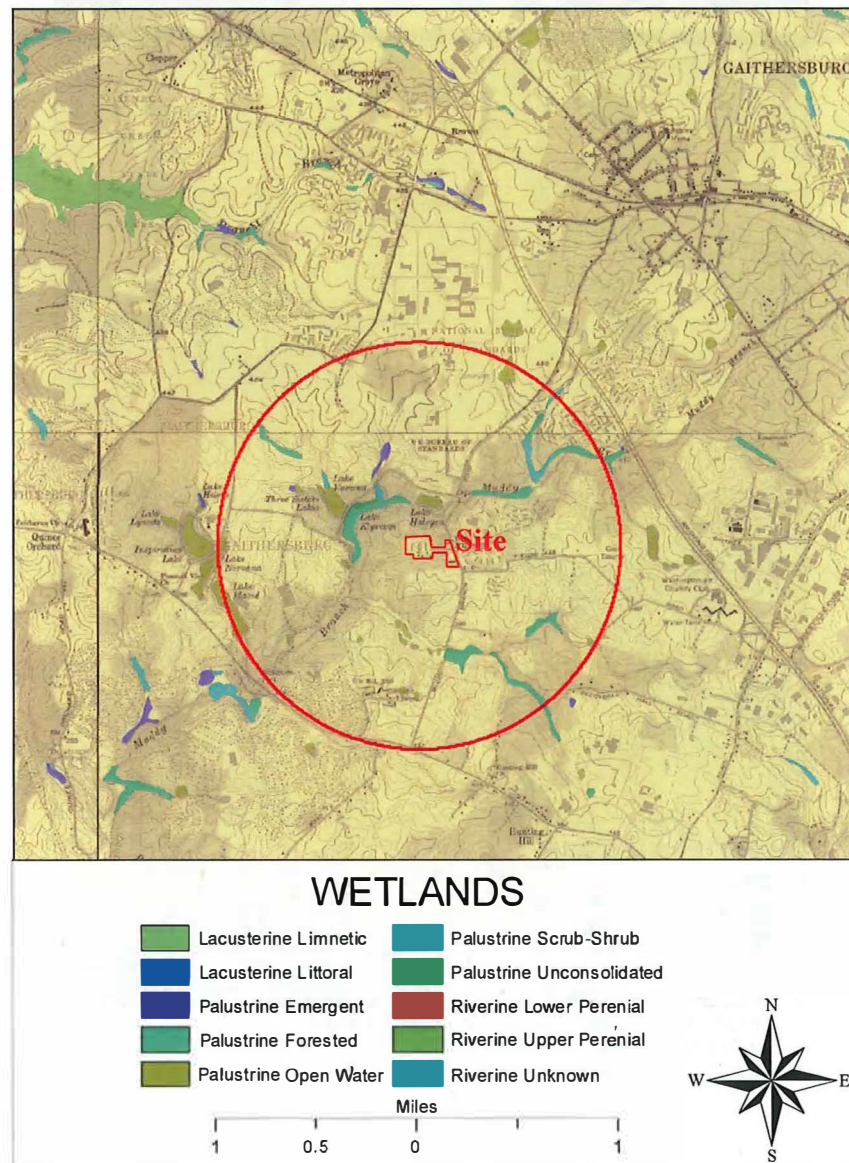




**Figure 8: Floodplain Map of Launch Site Area**

A=100 Year No Base Flood Elevation (BFE) Determined;  
AE= 100 Year with BFE Determined;  
X500=Area Inundated by 500 Year Flooding.

**Figure 9 –NWI Wetlands Map**

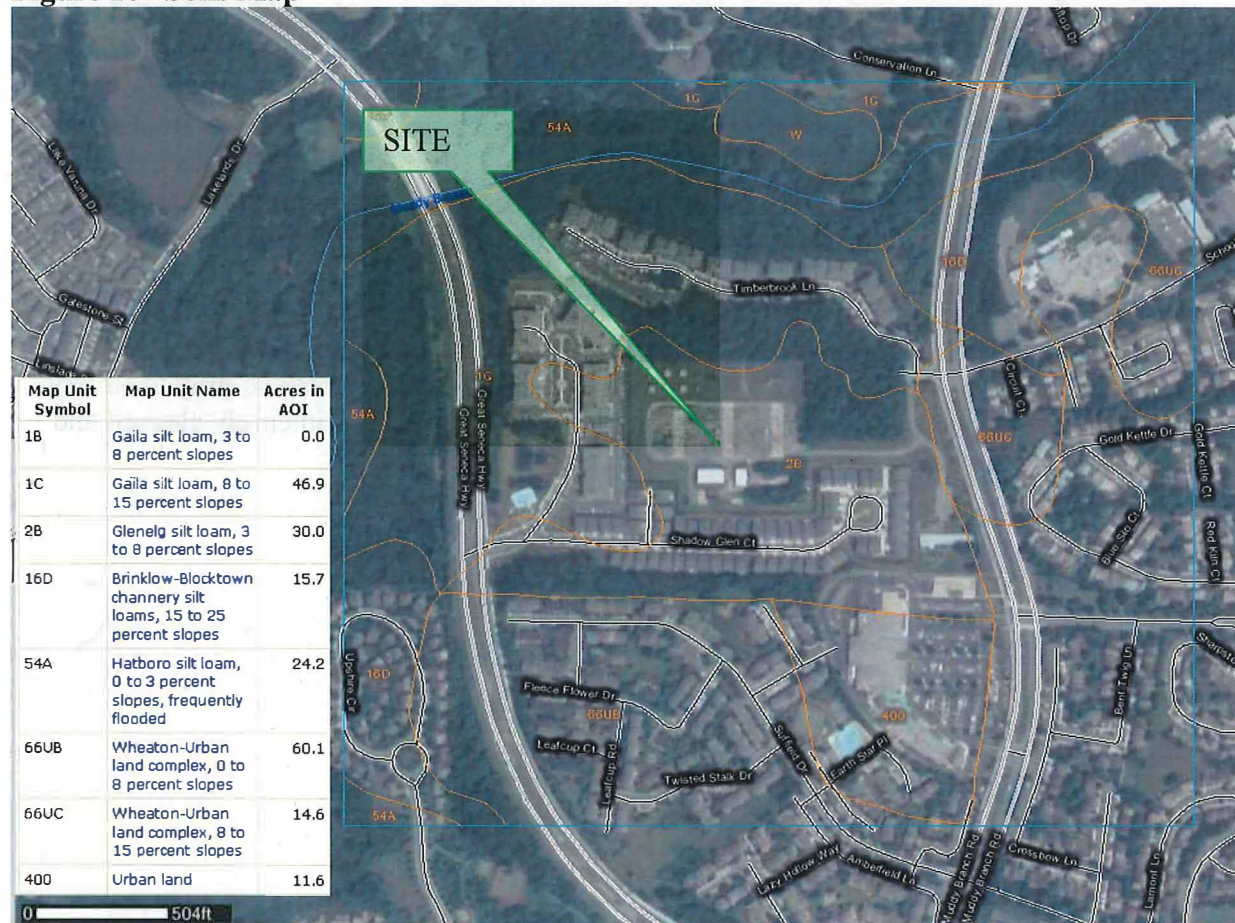




### 3.3 Soils

Soils on the site are listed from the “Soils of Montgomery County, Maryland” by the US Soil Conservation Service. Map units refer to each specific soil mapping unit. Soils at the Rockville site are predominantly Wheaton Urban land complex and Glenelg silt loam, with some Gaila silt loam north of the site (Figure 10).

**Figure 10 –Soils Map**



### 3.4 Geology and Groundwater

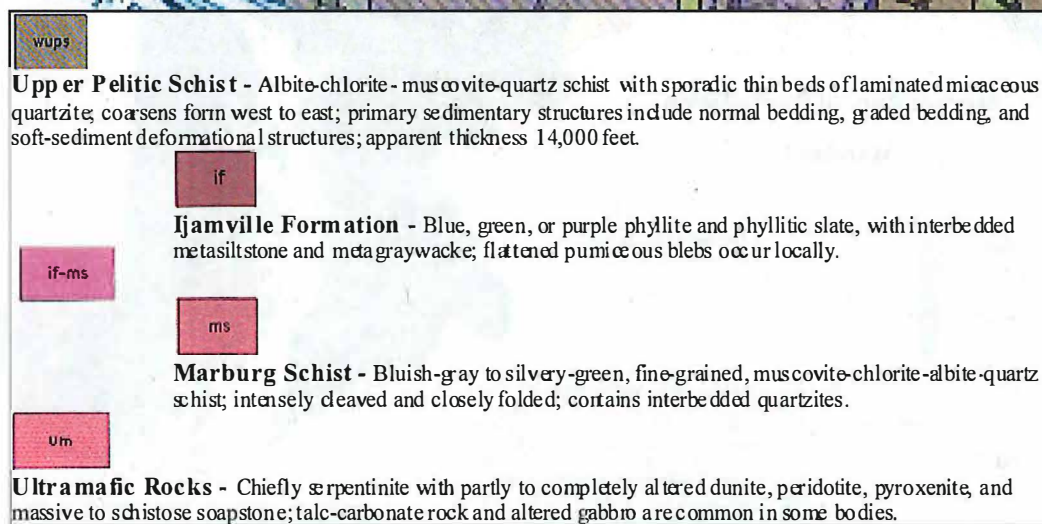
The site is located in the Eastern Division of the Piedmont Province west of the fall line. The Eastern Division of the piedmont province is underlain by a complex series of metamorphosed rocks, including gneisses, slates, phyllites, schists, marble, serpentine, and granitic and gabbroic rocks. Because of the variety of rock types, their varied resistance to erosion, and the complications in their structural relationships, this division has a highly diversified topography. The streams have relatively steep gradients with rapids and small waterfalls common.

In the immediate area of the site the geology is characterized as Ultramafic Rocks with some intrusions by the Ijamville Formation/Marburg Schists. The Ultramafic Rocks are chiefly serpentinite with partly to completely altered dunite, peridotite, pyroxenite, and massive to schistose soapstone; talc-carbonate rock and altered gabbro are common in some bodies.

The rocks of the Ijamville Formation are a blue, green, or purple phyllite and phyllitic slate, with interbedded metasiltstone and metagraywacke. Flattened pumiceous blebs occur locally within the Ijamville Formation. Those of the Marburg Schist are bluish-gray to silvery-green, fine-grained, muscovite-chlorite-albite-quartz schist. The rock is intensely cleaved and closely folded and generally contains interbedded quartzites (Figure 11).



The map shows the Gaithersburg, Maryland area. The Potomac River is on the left. Major roads include I-495, I-270, and I-70. Gaithersburg is at the top, with Washington Grove and Redland nearby. Darnestown is to the west, and Rockville is to the east. The SITE is marked with a star near Gaithersburg. Other locations include Hunting Hill, Derwood, and Harpoo. The map also shows various land use areas like 'um', 'wmk', 'wups', and 'wmg'.

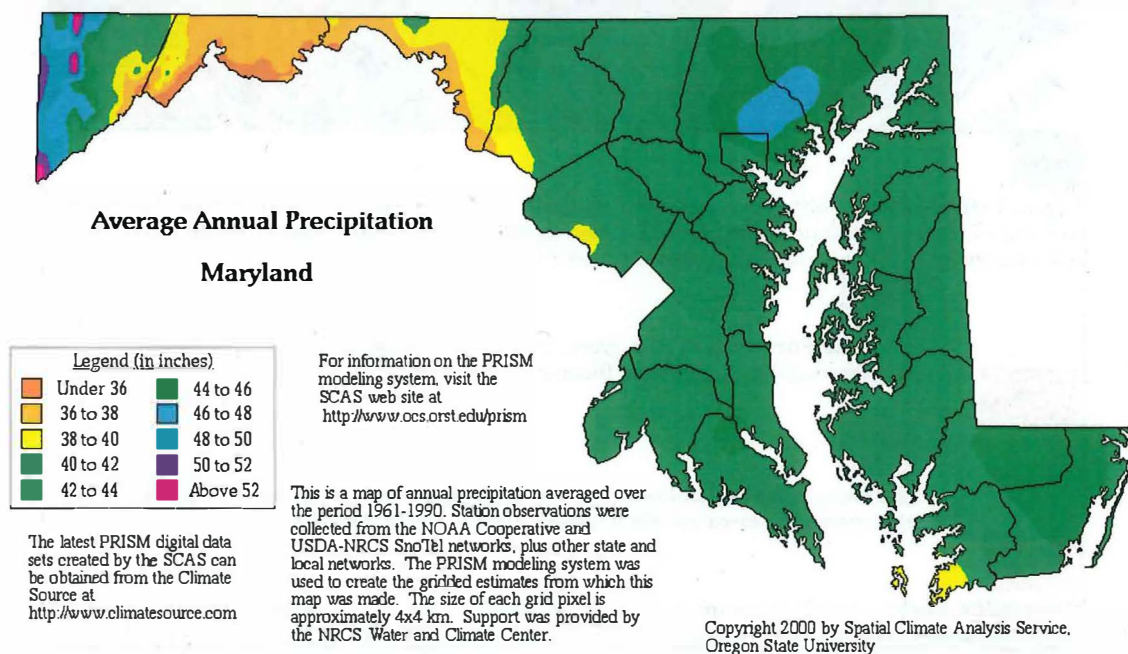


### 3.5 Meteorology

Summers are warm and sometimes humid and the winters are mild. Especially pleasant weather prevails in the spring and autumn. The coldest weather occurs in late January and early February, with an average daily maximum temperature of 7 °C (45 °F) and an average daily minimum of -2 °C (28 °F). The warmest weather occurs in late July, when daily high temperatures commonly exceed 30 °C (86 °F). There are no well-defined wet and dry seasons. Snowfall is not common, and averages only about 43cm (17in) per winter season. During the summer, showers are frequent. Thunderstorms occur on about one of every five days.

Prevailing winds in the Baltimore/Washington area are from a west-northwest direction at 7 miles per hour with a slight seasonal variation. Winds are more from the northwest in the winter and from the southwest in the summer. Coastal storms may produce heavy rain in the warmer months and heavy snow in the colder months in addition to high winds and coastal flooding. Thunderstorms may become severe and produce heavy rains, high winds, and hail. Precipitation is evenly distributed throughout the year (Fig. 12). Normal yearly precipitation is 42 to 44 inches with an annual snowfall of 21.6 inches. July is the wettest month with 4.18 inches of precipitation, and April is the driest month with a normal precipitation of 3.06 inches.

**Figure 12: Average Annual Precipitation in Maryland**





## 4.0 Waste Description

The Nike Ajax missile was a liquid fueled rocket using fuming red nitric acid mixed with unsymmetrical dimethyl hydrazine (UDMH) and JP-4 jet petroleum. The Nike Hercules missile used ammonium perchlorate as an oxidizer and synthetic rubber mixed with aluminum as the fuel.

Contaminants used at Nike sites include trichloroethene (TCE), tetrachloroethene (PCE), benzene, carbon tetrachloride and associated degreasing agents, petroleum compounds, red fuming nitric acid, dimethyl hydrazine, perchlorates, lead based paints, asbestos containing materials, polychlorinated biphenyls, pesticides and heavy metals.

## 5.0 Waste/Source Sampling

Soil and groundwater samples were collected from Geoprobe borings that were advanced around the perimeter of the operational area. CLP protocol was followed throughout the sample collection and submittal process (U.S. EPA, "CLP Guidance for Field Samplers," July 2011). The Quality Control (QC) used by MDE included the submittal of a field duplicate for each matrix. In addition, each matrix also had one sample designated as the spike sample, which was collected at specified additional volumes for CLP matrix spike QC procedures.

No surface water or sediment samples were collected for this phase of the Site Investigation.

### 5.1 Sample Locations

A total of 31 soil samples, 14 surface, 15 subsurface and two duplicate samples, were collected from the Rockville Launch Site. Surface soil samples were designated S-# and subsurface soil samples were designated SS-#. Grab samples were obtained from either Geoprobe® borings or hand augers. Extra volume was collected at S-6, S-7 and S-13 for laboratory spike samples.

S/SS-1 was the background sample and was collected from the mid-section of the northern fence line north of the missile silos. S/SS-2 through S/SS-16 were collected as described in the Sample Summary Table found in Section 5.1 and detailed on Figure 13. Soil concentrations were compared to the November 2011 USEPA Regional Screening Levels (Risk Based Concentration (RBC)) and MDE non-residential soil clean-up levels.

Five groundwater samples were proposed for the site (Figure 13). Five temporary monitoring wells were installed in Geoprobe® borings adjacent to soil sample locations S/SS-1 through S/SS-4 and S/SS-6. Groundwater samples were designated GW--1 through GW--5. Two quality assurance (QA) samples were planned for the groundwater matrix; GW--6 was the Field Blank and sample GW-7 was a Trip Blank. GW-15 was planned as a duplicate of GW-5. Groundwater concentrations were to be compared to the November 2011 USEPA RBC levels for tap water.

**Table 3: Sample Summary Table**

Sample Identification	Sample Type	Sample Location	Rationale	Parameters
<b>Soil Samples</b>				
S--1	Soil	Center of site just south of the northern fence line	Define area background	SVOC, Metals & Cyanide, Pesticides & PCBs
SS--1	Soil	Center of site just south of the northern fence line	Define area background	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
S--2	Soil	South of missile assembly building	Characterize Waste Migration.	SVOC, Metals & Cyanide, Pesticides & PCBs
SS--2	Soil	South of missile assembly building	Characterize Waste Migration.	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
S--3	Soil	Corner of fenced area southwest of Missile assembly building	Define contaminant migration patterns	SVOC, Metals & Cyanide, Pesticides & PCBs
SS--3	Soil	Corner of fenced area southwest of Missile assembly building	Define contaminant migration patterns	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
S--4	Soil	Corner of fenced area northwest of Missile assembly building	Define contaminant migration patterns	SVOC, Metals & Cyanide, Pesticides & PCBs
SS--4	Soil	Corner of fenced area northwest of Missile assembly building	Define contaminant migration patterns	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
S--5	Soil	East side of propellant handling building	Define contaminant migration patterns	SVOC, Metals & Cyanide, Nitro-aromatic Compounds Pesticides & PCBs
SS--5	Soil	East side of propellant handling building	Define contaminant migration patterns	VOC, SVOC, Metals & Cyanide, Nitro-aromatic Compounds Pesticides & PCBs
S--6 (Spike)	Soil	Western most corner of fenced area	Define contaminant migration patterns	SVOC, Metals & Cyanide, Pesticides & PCBs
SS--6	Soil	Western most corner of fenced area	Define contaminant migration patterns	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
DS--6	Soil	Western most corner of fenced area	Deep Soil Sample to define contaminant migration patterns	VOC
S--7 (Spike)	Soil	North side of propellant handling building	Define contaminant migration patterns	SVOC, Metals & Cyanide, Pesticides & PCBs
SS--7	Soil	North side of propellant handling building	Define contaminant migration patterns	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
S--8	Soil	South side of propellant handling building	Characterize Waste Source Area	SVOC, Metals & Cyanide, Pesticides & PCBs

Sample Identification	Sample Type	Sample Location	Rationale	Parameters
SS--8	Soil	South side of propellant handling building	Characterize Waste Source Area	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
S--9	Soil	West side of propellant handling building	Characterize Waste Source Area	SVOC, Metals & Cyanide, Pesticides & PCBs
SS--9	Soil	West side of propellant handling building	Characterize Waste Source Area	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
S--10	Soil	West of silos at midpoint of western fence line	Define contaminant migration patterns	SVOC, Metals & Cyanide, Pesticides & PCBs
SS--10	Soil	West of silos at midpoint of western fence line	Define contaminant migration patterns	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
S--11	Soil	Fence line south of propellant handling building	Define contaminant migration patterns	SVOC, Metals & Cyanide, Pesticides & PCBs
SS--11	Soil	Fence line south of propellant handling building	Define contaminant migration patterns	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
S--12	Soil	East of Missile assembly building	Characterize Waste Source Area	SVOC, Metals & Cyanide, Pesticides & PCBs
SS--12	Soil	East of Missile assembly building	Characterize Waste Source Area	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
S--13 (Spike)	Soil	North of Missile assembly building	Characterize Waste Source Area	SVOC, Metals & Cyanide, Pesticides & PCBs
SS--13	Soil	North of Missile assembly building	Characterize Waste Source Area	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
S--14	Soil	West of Missile assembly building	Characterize Waste Source Area	SVOC, Metals & Cyanide, Pesticides & PCBs
SS--14	Soil	West of Missile assembly building	Characterize Waste Source Area	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
SD--15	Soil	Western most corner of fenced area	Duplicate at SS-5	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs
SD--16	Soil	West of silos at midpoint of western fence line	Duplicate at SS-10	VOC, SVOC, Metals & Cyanide, Pesticides & PCBs

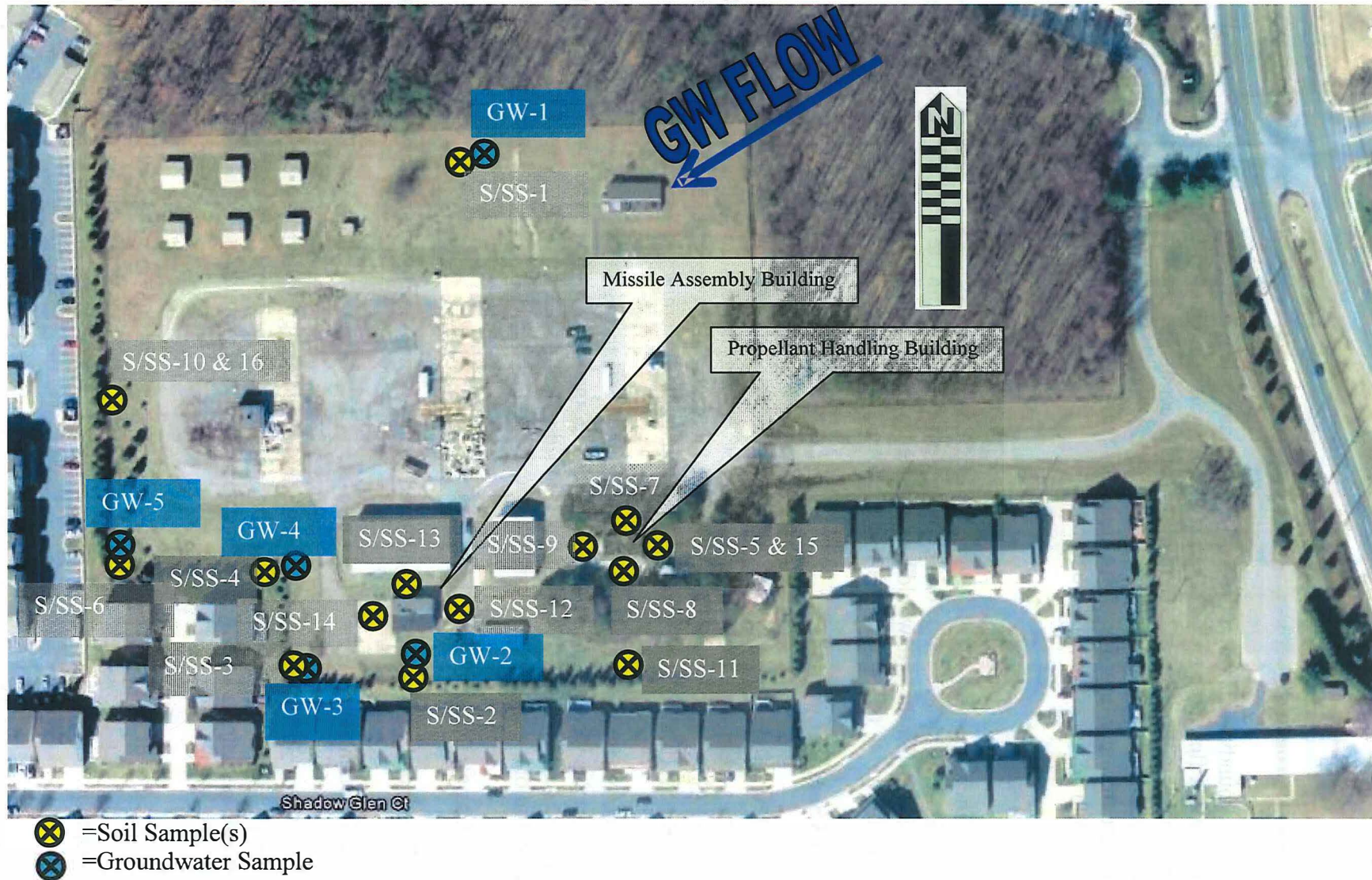


Sample Identification	Sample Type	Sample Location	Rationale	Parameters
<b>Groundwater Samples</b>				
GW--1	Water	Same Location as S/SS--1	Area Background	VOC, SVOC, total metals & cyanide, perchlorates, Pesticides & PCBs
GW--2	Water	Same Location as S/SS--2	Contaminant Migration Sample	VOC, SVOC, total metals & cyanide, perchlorates, Pesticides & PCBs
GW--3	Water	Same Location as S/SS--3	Contaminant Migration Sample	VOC, SVOC, total metals & cyanide, perchlorates, Pesticides & PCBs
GW--4 (Spike)	Water	Same Location as S/SS--4	Contaminant Migration Sample	VOC, SVOC, total metals & cyanide, perchlorates, Pesticides & PCBs
GW--5	Water	Same Location as S/SS--6	Contaminant Migration Sample	VOC, SVOC, total metals, perchlorates, Pesticides & PCBs
GW--6	Water	Field Blank	Field Blank	VOC, SVOC, total metals & cyanide, perchlorates, Pesticides & PCBs
GW--7	Water	Trip Blank	Trip Blank	VOC
GD--15	Water	Same Location as S/SS--5	Duplicate of GW-5	VOC, SVOC, total metals & cyanide, perchlorates, Pesticides & PCBs
GW--1-DM	Water	Same Location as S/SS--1	Area Background	dissolved metals
GW--2-DM	Water	Same Location as S/SS--2	Contaminant Migration Sample	dissolved metals
GW--3-DM	Water	Same Location as S/SS--3	Contaminant Migration Sample	dissolved metals
GW--4-DM (Spike)	Water	Same Location as S/SS--4	Contaminant Migration Sample	dissolved metals
GW--5-DM	Water	Same Location as S/SS--6	Contaminant Migration Sample	dissolved metals
GW--6-DM	Water	Field Blank	Field Blank	Dissolved metals
GD--15-DM	Water	Same Location as S/SS--5	Duplicate of GW-5 DM	dissolved metals

Pink Highlighted indicated QA/QC samples.



Figure 13: Sample Location Map



## **6.0 Ground Water Pathway**

### **6.1 Hydrogeology**

Groundwater flow at the Rockville Launch site is somewhat radial. The natural groundwater flow is to the west south west as shown on Figure 13, however there are components to the site that do not follow this exact trend. The site is on a man made plateau and has extensive underground structures that disrupt the natural flow patterns. This has resulted in prior groundwater flow direction estimations that have ranged over an almost 180 degree arc from north northwest to south southwest.

### **6.2 Targets**

There are no domestic source wells within one mile of the site. There are forty-five domestic wells located in the one to two mile radius ring from the center of the site. Targets to be considered for this site would be associated with vapor intrusion from soil gas and contamination of the upper water bearing zone.

### **6.3 Sample Locations**

Five groundwater samples were proposed for the site (Figure 13). Five temporary monitoring wells were installed in Geoprobe® borings adjacent to soil sample locations S/SS-1 through S/SS-4 and S/SS-6. The Geoprobe hit refusal at between 20 and 40 feet bgs. Soil was dry to depth. Temporary wells were installed and left overnight. No water had accumulated.

Groundwater samples were designated GW--1 through GW--5. Two quality assurance (QA) samples were planned for the groundwater matrix; GW--6 was the Field Blank sample GW-7 was a Trip Blank. GW-15 was planned as a duplicate of GW-5. Groundwater concentrations were to be compared to the November 2011 USEPA RBC levels for tap water.

### **6.4 Analytical Results**

Groundwater was not encountered in any of the Geoprobe temporary monitoring wells.

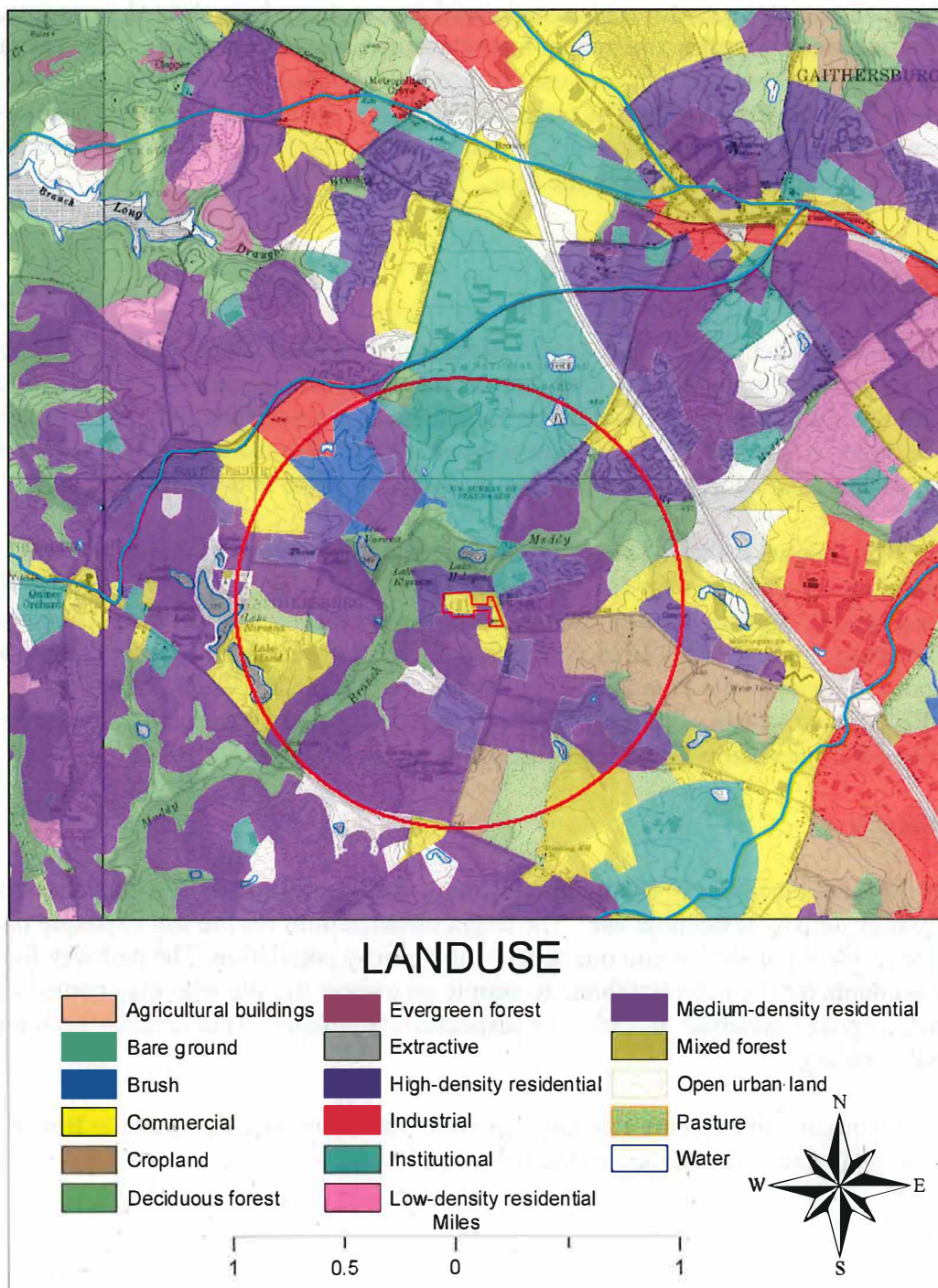
### **6.5 Conclusions**

Since site monitoring wells were abandoned and groundwater was not encountered in any of the Geoprobe borings no conclusions concerning groundwater can be made based on this SI. Previous assessment identified TCE at up to 21 ug/l in groundwater. The current EPA RBC for TCE is 0.44 ug/l.

The well logs for the abandoned monitoring wells identify the first water bearing zone at the site as being between 40 and 50 feet bgs. The site soil is dense and not easily penetrated with a Geoprobe.



**Figure 14: Land Use Surrounding Site**



## **7.0 Surface Water Pathway**

The surface water pathway addresses hazardous substance migration to surface water bodies, drinking water supplies, the human food chain and sensitive environments. The target population consists of those people who use surface water for drinking water or consume food chain species from target fisheries. The target distance limit for the surface water pathway is 15 miles downstream from the probable point of entry (PPE). The Potomac River is used for recreational and commercial fishing in the area.

### **7.1 Hydrology**

Rockville Launch lies in the Potomac River Montgomery County watershed. The site is located in a high relief topographical area characterized as a deep stream valley. The floodplain and wetland areas are mostly confined to the immediate area around the river and tributaries feeding the river. At the site the flood plain and wetlands are limited to the man-made ponds and the banks of the creek and tributaries. The site lies outside of the 100-year flood plain.

The TDL begins at the edge of the fence line and flows overland through several intermittent drainage pathways for approximately 1900 feet to Lake Elysium. Lake Elysium empties into Muddy Branch. Muddy Branch flows approximately 8.88 miles to its confluence with the Potomac River. Muddy Branch scribes a circuitous route and drops 200 feet in altitude from the point of entry to the Potomac River. There are two surface water intakes on the Potomac River Downstream of the confluence of the target pathway with the Potomac River. The 15 mile TDL ends below Great Falls just south of Rock Island.

### **7.2 Targets**

Rockville Launch lies in Montgomery County in the midst of an area characterized by medium to high density residential use. The target distance limit for the soil exposure pathway is 200 feet for resident population and one mile for the nearby population. The pathway for soil exposure accounts for the potential threat to people on or near the site who may come into contact with exposed materials and areas of suspect contamination. This includes both ingestion and dermal exposure.

Two thousand and seventy-two people reside within one-quarter of a mile from the site. There are no residents currently occupying the property.

**Table 4: Population Distribution within a Four-Mile Radius**

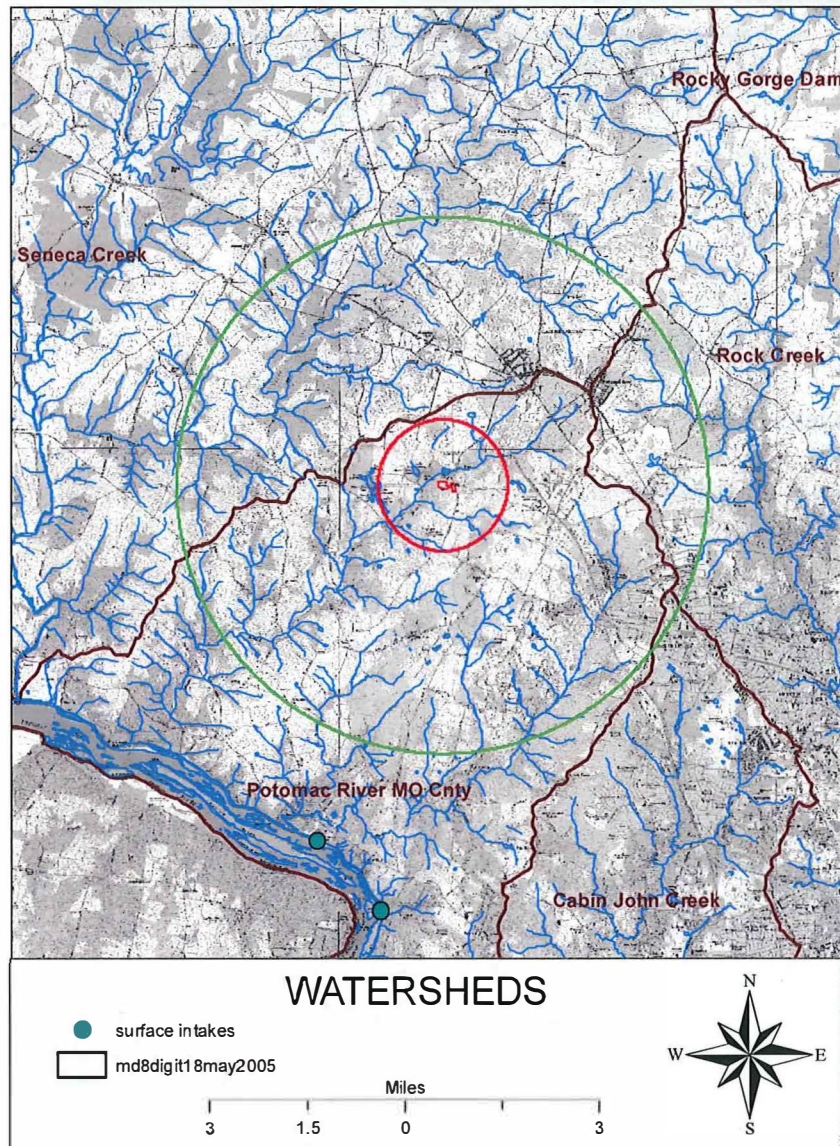
Ring Distance from the Site (Miles)	Estimated Population
0 – 0.25	2072
0.25 – 0.50	3034
0.50 – 1	7410
1 – 2	45,867
2 – 3	70,003
3 – 4	62,197
<b>TOTAL</b>	<b>190,583</b>

### 7.3 Conclusions

No surface water or sediment samples were collected for this phase of the SI.



**Figure 15: Area Watersheds**



## **8.0 Soil Exposure and Air Pathways**

### **8.1 Physical Conditions**

The site is located in a high relief topographical area characterized as a deep stream valley. The site is constructed on a tiered man made plateau surrounded by a chain link fence topped with barbed wire. The launch bays still exist but have been rendered inaccessible; metal plates have been welded over man ways. Site soils are compact clay loams containing very little moisture. The Geoprobe was unable to penetrate much below 35 feet below ground surface (bgs) due to the density of the site soils.

### **8.2 Soil and Air Targets**

Rockville Launch lies in Montgomery County in the midst of an area characterized by medium to high density residential use. The target distance limit for the soil exposure pathway is 200 feet for resident population and one mile for the nearby population. The pathway for soil exposure accounts for the potential threat to people on or near the site who may come into contact with exposed materials and areas of suspect contamination. This includes both ingestion and dermal exposure.

Two thousand and seventy-two people reside within one-quarter of a mile from the site. There are no residents currently occupying the property but there are numerous residences located on the edge of the fence line that scribes the property boundary. The site is used by NIST as a testing facility and for storage of excised equipment. Numerous employees occupy the site on a routine basis.

### **8.3 Soil Sample Locations**

A total of 31 soil samples, 14 surface, 15 subsurface and two duplicate samples, were collected from the Rockville Launch Site. Surface soil samples were designated S-# and subsurface soil samples were designated SS-#. One additional subsurface sample was collected at a deeper stratum at sample location S/SS-6 and labeled DS-6. Grab samples were obtained from either Geoprobe® borings or hand augers. Extra volume was collected at S-6, S-7 and S-13 for laboratory spike samples. Soil duplicate samples (SD-15 and 16) were collected concurrent with SS-5 and SS-10 respectively.

S/SS-1 was the background sample and was collected from the mid-section of the northern fence line north of the missile silos. S/SS-2 through S/SS-16 were collected as described in the Sample Summary Table 3 found in Section 5.1 and detailed on Figure 13.



## 8.4 Soil Analytical Results

Soil concentrations were compared to the June 2011 USEPA Regional Screening Levels (Risk Based Concentration (RBC)) and MDE non-residential soil clean-up levels.

Arsenic and chromium were universally greater than the RBC in surface soils and generally greater than the RBC in subsurface soils. Arsenic was just below the RBC level in subsurface soils collected from SS-3, SS-5, SS-7 and SS-15. Cobalt was identified at levels above the RBC for industrial soil in the samples collected at S-3, S-6 and SS-14. The sample collected from S-3 contained lead and cyanide levels significantly greater than levels found in the site background.

Phenanthrene, fluoranthene, and pyrene were identified in four samples, S-2, S-4, S-10 and S-13 at levels significantly greater than the site background. Sample S-13 also contained benzo(a)anthracene at levels significantly greater than site background. Sample S-2 contained phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene and indeno(1,2,3-cd)pyrene at levels significantly greater than site background. Sample S-4 contained phenanthrene, fluoranthene, pyrene and benzo(a)anthracene at levels significantly greater than site background. Sample S-11 contained butylbenzylphthalate at a level significantly greater than site background. All of these identified levels were less than their individual RBCs except for the sample collected at S-2 which contained levels of benzo(a)pyrene above the RBC. There is no RBC for phenanthrene.

Aroclor 1260 was identified in surface soil sample S-11 at a level significantly above background but less than the RBC for industrial soil. The pesticide 4,4'-DDT was identified in surface soil samples S-2, S-3, S-4, S-6, S-7, S-10, S-11, S-13 and S-14 at a level significantly greater than background. DDT was not identified in the subsurface soil sample at a level significantly greater than background. The pesticide 4,4'-DDE was identified in surface soil samples S-3 and S-7 at a level significantly greater than background. The pesticide 4,4'-DDD was also identified in surface soil sample S-3 at a level significantly greater than background. All identified levels of pesticides were below the RBC for industrial soil.

Contaminants were identified on site but at levels generally below RBC. The toxicological report for the site identified a risk to the child visitor from the additive effects of the ingestion of site surface soils.



Table 5: Inorganic Contamination of Surface Soil

mg/kg	S-1 Background	S-2	S-3	S-4	S-5	S-6	S-7	RBC
Aluminum	12800 J	14600 J	13300 J	15400 J	25500 J	9820 J	22300 J	9.9E+05
Antimony	ND	ND	ND	ND	1.20 J	ND	0.99 J	4.1E+02
Arsenic	4.60	4	4.30	3.80	4.40	2.80	3.60	1.6
Barium	66.30 J	60.50 J	77 J	53.70 J	37.30 J	42 J	38.90 J	1.9E+05
Beryllium	0.45 J	0.42 J	0.28 J	0.30 J	0.29 J	0.30 J	0.34 J	2.0E+03
Cadmium	ND	0.079 J	ND	ND	ND	ND	ND	800
Calcium	444 J	856 J	448 J	786 J	436 J	405 J	215 J	--
Chromium	20.50 L	18.80 L	24.10 L	20.40 L	31.90	12.50 L	26.80	5.6
Cobalt	14	17.50	23.20	11.20	6.20 J	24.20	7.50 J	23
Copper	12.30 J	21.50 J	16 J	13.50 J	29.50 J	19.50 J	31.80 J	4.1E+04
Iron	27300 J	27100 J	22500 J	25400 J	40700 J	20900 J	34100 J	7.2E+05
Lead	17 K	25.40 K	75.10 K	26.10 K	20.30 J	20 K	18.60 J	800
Magnesium	838 J	790 J	1050 J	914 J	603 J	582 J	612 J	--
Manganese	558 J	293 J	370 J	207 J	77.30 J	345 J	105 J	2.3E+04
Mercury	0.14	0.12 J	0.17	0.15	ND	0.12 J	0.050 J	43
Nickel	16.60	15.20	18.20	12.30	13.90	12.50	12.30	2.0E+04
Potassium	760 J	891 J	775 J	928 J	852 J	670 J	818 J	--
Selenium	ND	ND	ND	ND	1.70 J	ND	1.60 J	5.1E+03
Silver	ND	ND	ND	ND	1.10 J	ND	0.94 J	5.1E+03
Sodium	26.70 J	66.30 J	26 J	38.40 J	900	ND	30.80 J	--
Thallium	0.48 J	ND	ND	0.36 J	ND	ND	ND	10
Vanadium	34.90 J	33.50 J	25.80 J	36.50 J	63.40 J	23.70 J	48.80 J	5.2E+03
Zinc	39.80	56.20	110	34.10	29.50 J	47.40	28.90 J	3.1E+05
Cyanide	ND	ND	ND	ND	0.61 R	ND	0.52 R	2.0E+04

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; L = Analyte present, actual value is expected to be higher; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; += result based on dilution; K = analyte present, reported value may be biased high., actual value is expected to be lower; NA = not analyzed; **Yellow Highlighted** = Exceeds Regulatory Standards; **RED Font** = Exceeds three times Background and/or exceeds Contract Required Detection Limit.

1 – EPA Region III Risk Based Concentrations for Non-Residential Soils (June 2011). 2 – MDE Cleanup Standards for Non-Residential Soils (June 2009).

Table 5 (Cont.): Inorganic Contamination of Surface Soil

mg/kg	S-1 Background	S-8	S-9	S-10	S-11	S-12	S-13	S-14	RBC
Aluminum	12800 J	16000 J	13000 J	14600 J	18800 J	15100 J	16600 J	8490 J	9.9E+05
Antimony	ND	0.91 J	0.85 J	ND	ND	1 J	0.79 J	0.82 J	4.1E+02
Arsenic	4.60	3	2.50	3.40	4.30	4.90	4	1.60	1.6
Barium	66.30 J	36.40 J	28.20 J	52.60 J	56.80 J	75.90 J	68 J	25.30 J	1.9E+05
Beryllium	0.45 J	0.26 J	0.19 J	0.33 J	0.46 J	0.35 J	0.31 J	0.27 J	2.0E+03
Cadmium	ND	ND	ND	ND	ND	ND	0.25 J	ND	800
Chromium	20.50 L	20.50	18.20	17.40 L	23.70 L	22.10	20.40	13.80	5.6
Cobalt	14	10.80 J	8 J	18.90	11.20	19.50 J	13.10 J	20.30 J	23
Copper	12.30 J	22.90 J	21.90 J	17 J	20.90 J	17.20 J	19.20 J	23.90 J	4.1E+04
Iron	27300 J	29900 J	27200 J	22300 J	30200 J	31200 J	25700 J	24600 J	7.2E+05
Lead	17 K	14.20 J	13.30 J	24.20 K	21.20 K	16.10 J	29.20 J	12.40 J	800
Magnesium	838 J	822 J	616 J	1760 J	863 J	893 J	931 J	363 J	--
Manganese	558 J	115 J	93.90 J	242 J	217 J	433 J	278 J	329 J	2.3E+04
Mercury	0.14	ND	ND	0.099 J	0.13	ND	ND	ND	43
Nickel	16.60	12.50	10.20	21.90	16.20	15.80	13.90	9.90	2.0E+04
Selenium	ND	1.40 J	1.30 J	ND	ND	1.50 J	1.50 J	1.20 J	5.1E+03
Silver	ND	0.78 J	0.68 J	ND	ND	0.63 J	0.57 J	0.48 J	5.1E+03
Thallium	0.48 J	ND	ND	ND	0.28 J	ND	ND	ND	10
Vanadium	34.90 J	36.20 J	31.30 J	31.50 J	43.50 J	35.90 J	32.70 J	24.50 J	5.2E+03
Zinc	39.80	25.80 J	21.50 J	53.50	87.40	31.60 J	42.10 J	18.20 J	3.1E+05
Cyanide	ND	0.6 R	0.59 R	ND	ND	0.6 R	ND	0.28 J	2.0E+04

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; L = Analyte present, actual value is expected to be higher; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; += result based on dilution; K = analyte present, reported value may be biased high., actual value is expected to be lower; NA = not analyzed; Yellow Highlighted = Exceeds Regulatory Standards; RED Font = Exceeds three times Background and/or exceeds Contract Required Detection Limit.

1 – EPA Region III Risk Based Concentrations for Non-Residential Soils (June 2011).

2 – MDE Cleanup Standards for Non-Residential Soils (June 2009).

Table 6: Inorganic Contamination of Subsurface Soil

mg/kg	SS-1 Background	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	RBC
Aluminum	17000 J	26900 J	12200 J	22900 J	10700 J	20200 J	7680 J	22700 J	9.9E+05
Antimony	ND	ND	ND	ND	0.80 J	ND	0.94 J	0.95 J	4.1E+02
Arsenic	4.80	4.60	1.50	4.30	1.30	4.80	0.76 J	4.70	1.6
Barium	45.20 J	35.80 J	21.10 J	52.50 J	20.50 J	50.80 J	14.80 J	45.50 J	1.9E+05
Beryllium	0.44 J	0.49 J	0.21 J	0.53 J	0.42 J	0.40 J	0.52 J	0.22 J	2.0E+03
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	800
Chromium	28.50 L	16.90 L	7 L	27.70 L	16.60	27.40 L	9.50	26.90	5.6
Cobalt	17.20	8	48	6.30	2 J	12.10	3.40 J	10.30 J	23
Copper	20.50 J	41 J	59.80 J	32.30 J	16 J	25 J	33.60 J	19.70 J	4.1E+04
Iron	34700 J	30700 J	16500 J	41200 J	25000 J	38800 J	29200 J	32500 J	7.2E+05
Lead	11.90 K	13.80 K	17.40 K	23.60 K	13.90 J	15.60 K	20.10 J	14.70 J	800
Magnesium	1210 J	471 J	1050 J	736 J	277 J	808 J	136 J	1560 J	--
Manganese	173 J	77.50 J	678 J	109 J	38.70 J	185 J	69.60 J	145 J	2.3E+04
Mercury	0.082 J	0.11 J	0.0955 J	0.11 J	ND	0.095 J	ND	ND	43
Nickel	15.60	16.50	23.30	15.10	5.20	18.50	4.90	17	2.0E+04
Selenium	ND	ND	ND	ND	1.2 J	ND	ND	1.5 J	5.1E+03
Silver	ND	ND	ND	ND	0.50 J	ND	0.72 J	1.10 J	5.1E+03
Thallium	0.37 J	ND	ND	ND	ND	0.30 J	ND	ND	10
Vanadium	41.10 J	33.80 J	13.40 J	58.80 J	36.70 J	49.80 J	23.80 J	46.90 J	5.2E+03
Zinc	37.20	23.20	45.30	28	14.60 J	31.10	12.80 J	38.50 J	3.1E+05
Cyanide	ND	ND	ND	ND	0.61 R	ND	0.56 R	0.6 R	2.0E+04

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; L = Analyte present, actual value is expected to be higher; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; += result based on dilution; K = analyte present, reported value may be biased high., actual value is expected to be lower; NA = not analyzed; Yellow Highlighted = Exceeds Regulatory Standards; RED Font = Exceeds three times Background and/or exceeds Contract Required Detection Limit.

1 – EPA Region III Risk Based Concentrations for Non-Residential Soils (June 2011).

2 – MDE Cleanup Standards for Non-Residential Soils (June 2009).



Table 6 (Cont.): Inorganic Contamination of Subsurface Soil

mg/kg	SS-1 Background	SS-9	SS-10	SD-16 Dup SS-10	SS-11	SD-15 Dup SS-5	SS-12	SS-13	SS-14	RBC
Aluminum	17000 J	21800 J	20200 J	19200 J	27900 J	11500 J	18500 J	19600 J	15000 J	9.9E+05
Antimony	ND	1.40 J	ND	ND	ND	0.85 J	1.30 J	1.10 J	0.76 J	4.1E+02
Arsenic	4.80	3.30	2.10	2	4.30	1.40	3.30	4.10	3.70	1.6
Barium	45.20 J	35.60 J	26.50 J	25 J	65.30 J	21.30 J	41.80 J	40.90 J	31.90 J	1.9E+05
Beryllium	0.44 J	0.69	0.26 J	0.24 J	0.46 J	0.46 J	0.39 J	0.42 J	0.32 J	2.0E+03
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND	800
Chromium	28.50 L	30.70	27.10 L	25.50 L	29.90 L	17.30	25.20	19.50	15.70	5.6
Cobalt	17.20	15.80 J	5 J	7.10	14.40	2.10 J	8.30 J	5 J	32.60 J	23
Copper	20.50 J	41.10 J	16.40 J	16.10 J	25 J	16.70 J	29.50 J	22.80 J	33.20 J	4.1E+04
Iron	34700 J	41400 J	28300 J	28200 J	36300 J	25600 J	40000 J	34800 J	24900 J	7.2E+05
Lead	11.90 K	12.40 J	20.90 K	20.80 K	17.30 K	14.10 J	16.50 J	14.40 J	18.60 J	800
Magnesium	1210 J	638 J	257 J	269 J	876 J	274 J	842 J	584 J	862 J	--
Manganese	173 J	92.30 J	40.30 J	41.20 J	197 J	41.10 J	134 J	59.30 J	257 J	2.3E+04
Mercury	0.0825 J	ND	0.091 J	0.10 J	0.11 J	0.088 J	ND	0.069 J	ND	43
Nickel	15.60	15	12.10	11.10	17.40	5.20	15.60	14.30	14.90	2.0E+04
Selenium	ND	1.6	ND	ND	ND	1.4 J	1.6 J	1.7 J	1.2 J	5.1E+03
Silver	ND	1.30	ND	ND	ND	0.67 J	1.20	0.87 J	0.51 J	5.1E+03
Thallium	0.37 J	ND	0.16 J	ND	0.32 J	ND	ND	ND	ND	10
Vanadium	41.10 J	43.60 J	49.80 J	49.40 J	59.60 J	38.90 J	45.40 J	37.90 J	26.80 J	5.2E+03
Zinc	37.20	25.20 J	18.80	18.60	42.40	15.50 J	26.60 J	21.60 J	31.10 J	3.1E+05
Cyanide	ND	0.57 R	ND	ND	ND	0.61 R	0.59 R	0.61 R	0.59 R	2.0E+04

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; L = Analyte present, actual value is expected to be higher; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; +/- result based on dilution; K = analyte present, reported value may be biased high, actual value is expected to be lower; NA = not analyzed; Yellow Highlighted = Exceeds Regulatory Standards; RED Font = Exceeds three times Background and/or exceeds Contract Required Detection Limit.

1 – EPA Region III Risk Based Concentrations for Non-Residential Soils (Nov. 2011).

2 – MDE Cleanup Standards for Non-Residential Soils (June 2009).

Table 7: SVOC Data for Surface Soil

ug/kg	S-1 *	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	S-12	S-13	S-14	RBC
Benzaldehyde	ND	92 J	140 J	130 J	ND	ND	ND	ND	ND	ND	120 J	ND	ND	ND	1.0E+08
Naphthalene	ND	27 J	6.60 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8E+06
2-Methylnaphthalene	ND	8.40 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.1E+06
Acenaphthene	ND	34 J	ND	6.70 J	ND	ND	ND	ND	ND	ND	ND	ND	8.2 J	ND	3.3E+07
Diethylphthalate	ND	ND	ND	ND	6.6 J	ND	ND	ND	5.9 J	ND	ND	ND	ND	ND	4.9E+08
Dibenzofuran	ND	19 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0E+06
Fluorene	ND	23 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.1E+07
Phenanthrene	6.50 J	370	12 J	44 J	ND	ND	6.5 J	ND	ND	26 J	7 J	ND	87 J	7.3 J	--
Anthracene	ND	57 J	ND	12 J	ND	ND	ND	ND	ND	6.40 J	ND	ND	16 J	ND	1.7E+08
Carbazole	ND	61 J	ND	6.20 J	ND	ND	ND	ND	ND	ND	ND	ND	13 J	ND	--
Di-n-butylphthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.2E+07
Fluoranthene	9.90 J	570	12 J	55 J	ND	11 J	ND	ND	ND	35 J	12 J	ND	130 J	14 J	2.2E+07
Pyrene	9.40 J	410	12 J	46 J	ND	12 J	ND	ND	ND	30 J	13 J	ND	130 J	22 J	1.7E+07
Butylbenzylphthalate	9.60 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	44 J	ND	ND	ND	9.1E+05
Benzo(a)anthracene	7.90 J	290	9.80 J	32 J	ND	9.10 J	ND	ND	ND	16 J	9.70 J	ND	65 J	17 J	2.1E+03
Chrysene	ND	310	7.60 J	27 J	ND	6.80 J	ND	ND	ND	12 J	7.50 J	ND	66 J	10 J	2.1E+05
Benzo(b)fluoranthene	ND	380	10 J	33 J	ND	ND	ND	ND	ND	14 J	ND	ND	82 J	19 J	2.1E+03
Benzo(k)fluoranthene	ND	120 J	ND	12 J	ND	ND	ND	ND	ND	ND	ND	ND	60 J	ND	2.1E+04
Benzo(a)pyrene	ND	250	ND	26 J	ND	ND	ND	ND	ND	10 J	ND	ND	51 J	13 J	2.1E+02
Indeno(1,2,3-cd)pyrene	ND	220	ND	25 J	ND	ND	ND	ND	ND	6.9 J	ND	ND	45 J	13 J	2.1E+03
Dibenzo(a,h)anthracene	ND	53 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14 J	ND	2.1E+02
Benzo(g,h,i)perylene	ND	10 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12 J	ND	--

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; L=Analyte present, actual value is expected to be higher; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; += result based on dilution; K = analyte present, reported value may be biased high., actual value is expected to be lower; NA=not analyzed; Yellow Highlighted = Exceeds Regulatory Standards; RED Font = Exceeds three times Background and/or exceeds Contact Required Detection Limit.

1 – EPA Region III Risk Based Concentrations for Non-Residential Soils (Nov. 2011).

2 – MDE Cleanup Standards for Non-Residential Soils (June 2009).

\* - Background Sample

Table 8: SVOC Data for Subsurface Soil

ug/kg	SS-1 Background	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	SS-9	SS-10	SS-11	SS-12	SS-13	SS-14	SD-15 Dup of SS-5	SD-16 Dup of SS-10	RBC
Diethylphthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.8 J	ND	ND	ND	ND	ND	4.9E+08

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; L = Analyte present, actual value is expected to be higher; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; += result based on dilution; K = analyte present, reported value may be biased high, actual value is expected to be lower; NA = not analyzed; **Yellow Highlighted** = Exceeds Regulatory Standards; **RED Font** = Exceeds three times Background and/or exceeds Contract Required Detection Limit.

1 – EPA Region III Risk Based Concentrations for Non-Residential Soils (Nov. 2011).

2 – MDE Cleanup Standards for Non-Residential Soils (June 2009).



Table 9: VOC Data for Subsurface Soil

Ug/kg	SS-1*	SS-2	SS-3	SS-4	SS-6	DS-6	SD-16	SS-10	SS-11	RBC
Toluene	0.61 J	ND	ND	ND	ND	ND	ND	ND	ND	4.5E+07
o-Xylene	0.45 J	ND	ND	ND	ND	ND	ND	ND	ND	3.0E+06

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; L = Analyte present, actual value is expected to be higher; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; += result based on dilution; K = analyte present, reported value may be biased high, actual value is expected to be lower; NA = not analyzed; **Yellow Highlighted** = Exceeds Regulatory Standards; **RED Font** = Exceeds three times Background and/or exceeds Contract Required Detection Limit.

1 – EPA Region III Risk Based Concentrations for Non-Residential Soils (Nov. 2011).

2 – MDE Cleanup Standards for Non-Residential Soils (June 2009).

\* - Background Sample

Table10: Surface Soil Pesticide and PCB Data Table

ug/kg	S-1 Background	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	RBC
Delta-BHC	ND	ND	ND	ND	0.31 J	ND	0.57 J	ND	ND	--
gamma-BHC (Lindane)	ND	ND	ND	ND	ND	ND	ND	ND	ND	2100
Heptachlor	ND	ND	0.096 J	ND	ND	ND	ND	ND	ND	380
Aldrin	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
Heptachlor epoxide	ND	ND	0.23 J	ND	ND	0.13 J	ND	ND	ND	190
Endosulfan I	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.7E+06
Dieldrin	ND	ND	0.28 J	ND	ND	ND	ND	ND	ND	110
4,4'-DDE	ND	1.20 J	120.00	2.00 J	ND	1.30 J	5.3	0.52 J	1.3 J	5100
Endrin	ND	ND	0.93 J	0.19 J	ND	0.12 J	ND	ND	ND	1.8E+05
Endosulfan II	ND	ND	0.94 J	0.21 J	ND	ND	ND	ND	ND	3.7E+06
4,4'-DDD	ND	0.31 J	6.50 J	ND	ND	ND	1.7 J	ND	0.3 J	7200
Endosulfan sulfate	ND	ND	1.10 J	ND	ND	ND	ND	ND	ND	--
4,4'-DDT	0.12 J	2.40 J	410.00	2.70 J	ND	0.71 J	4.4	ND	ND	7000
Methoxychlor	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.1E+06
Endrin ketone	ND	0.80 J	ND	ND	ND	ND	0.52 J	ND	ND	--
alpha-Chlordane	ND	ND	0.28 J	ND	ND	ND	ND	ND	ND	6500
gamma-Chlordane	ND	ND	0.44 J	ND	ND	ND	ND	ND	ND	6500
Aroclor-1260	ND	ND	ND	ND	ND	ND	ND	ND	ND	740

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; L = Analyte present, actual value is expected to be higher; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; += result based on dilution; K = analyte present, reported value may be biased high, actual value is expected to be lower; NA = not analyzed; **Yellow Highlighted** = Exceeds Regulatory Standards; **RED Font** = Exceeds three times Background and/or exceeds Contract Required Detection Limit.

1 – EPA Region III Risk Based Concentrations for Non-Residential Soils (Nov. 2011).

2 – MDE Cleanup Standards for Non-Residential Soils (June 2009).

ug/kg	S-1 Background	S-10	S-11	S-12	S-13	S-14	RBC
gamma-BHC (Lindane)	ND	ND	0.71 J	ND	ND	ND	2100
Heptachlor	ND	ND	0.49 J	ND	ND	ND	380
Aldrin	ND	ND	0.30 J	ND	0.2 B	0.16 B	100
Heptachlor epoxide	ND	ND	ND	ND	ND	ND	190
Endosulfan I	ND	ND	0.59 J	ND	ND	ND	3.7E+06
Dieldrin	ND	ND	0.17 J	ND	ND	ND	110
4,4'-DDE	ND	0.18 J	1.00 J	0.23 J	0.47 J	0.24 J	5100
Endrin	ND	ND	0.47 J	ND	ND	ND	1.8E+05
Endosulfan II	ND	ND	0.24 J	ND	ND	ND	3.7E+06
4,4'-DDD	ND	ND	ND	ND	ND	ND	7200
Endosulfan sulfate	ND	ND	ND	ND	ND	ND	--
4,4'-DDT	0.12 J	0.40 J	6.80 J	ND	1.4 J	0.49 J	7000
Methoxychlor	ND	1.40 J	0.59 J	ND	ND	ND	3.1E+06
Endrin ketone	ND	0.24 J	1.30 J	ND	0.093 J	ND	--
alpha-Chlordane	ND	ND	0.04 J	ND	ND	ND	6500
gamma-Chlordane	ND	ND	0.16 J	ND	ND	ND	6500
Aroclor-1260	ND	ND	67.00 J	ND	ND	ND	740

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; L=Analyte present, actual value is expected to be higher; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; += result based on dilution; K = analyte present, reported value may be biased high, actual value is expected to be lower; NA=not analyzed; **Yellow Highlighted**= Exceeds Regulatory Standards; **RED Font**= Exceeds three times Background and/or exceeds Contract Required Detection Limit.

1 – EPA Region III Risk Based Concentrations for Non-Residential Soils (Nov. 2011).

2 – MDE Cleanup Standards for Non-Residential Soils (June 2009).



Table 11: Subsurface Soil Pesticide Data

ug/kg	SS-1*	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	SS-9	RBC
alpha-BHC	ND	0.091 J	ND	ND	ND	ND	ND	ND	ND	270
Delta-BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
gamma-BHC (Lindane)	ND	0.17 J	ND	ND	ND	ND	ND	ND	ND	2100
Heptachlor	ND	ND	ND	ND	ND	ND	ND	ND	0.087 J	380
Aldrin	0.70 J	0.75 J	0.18 J	0.55 J	ND	0.47 J	ND	ND	ND	100
4,4'-DDT	ND	ND	0.23 J	0.37 J	ND	ND	ND	ND	ND	7000
Methoxychlor	ND	ND	ND	0.80 J	ND	ND	1.1 J	ND	ND	6.1E+06
Endrin	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8E+05
Endrin ketone	0.34 J	ND	0.32 J	ND	ND	ND	0.36 J	ND	0.16 J	--

ug/kg	SS-1*	SS-10	SS-11	SS-12	SS-13	SS-14	SD-15	SD-16	RBC
alpha-BHC	ND	ND	ND	ND	ND	ND	ND	ND	270
Delta-BHC	ND	ND	ND	ND	0.3 J	ND	0.41 J	ND	--
gamma-BHC (Lindane)	ND	ND	ND	ND	ND	ND	ND	ND	2100
Heptachlor	ND	ND	ND	ND	ND	ND	ND	ND	380
Aldrin	0.70 J	0.82 J	0.40 J	ND	ND	ND	ND	ND	100
4,4'-DDT	ND	ND	0.17 J	ND	ND	ND	ND	ND	7000
Methoxychlor	ND	ND	1.70 J	ND	ND	ND	ND	ND	6.1E+06
Endrin	ND	ND	ND	ND	ND	ND	ND	ND	1.8E+05
Endrin ketone	0.34 J	ND	0.24 J	ND	ND	ND	ND	ND	--

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; L = Analyte present, actual value is expected to be higher; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; += result based on dilution; K = analyte present, reported value may be biased high., actual value is expected to be lower; NA = not analyzed; **Yellow Highlighted** = Exceeds Regulatory Standards; **RED Font** = Exceeds three times Background and/or exceeds Contract Required Detection Limit.

1 – EPA Region III Risk Based Concentrations for Non-Residential Soils (Nov. 2011).

2 – MDE Cleanup Standards for Non-Residential Soils (June 2009).

\* - Background Sample

## 8.5 Air Monitoring

Air monitoring was not conducted during this phase of the investigation.

## 9.0 Conclusions And Recommendations

A toxicological evaluation was performed based on data collected by MDE in October 2011. The assessment determined that there was limited risk to the child visitor from ingestion of site soils. The groundwater pathway was not addressed in this toxicological assessment. A copy of the toxicological assessment is found in Appendix D of this report.

TCE has been identified in groundwater and as soil vapor on the W-92 Nike site.

Between 1988 and 2008, eight environmental assessments were conducted at the facility.

- Woodward-Clyde, Confirmation Study – 1988
- EA Engineering, Site Investigation – 1989
- USACE Groundwater Sampling – 1994
- USACE DERP Inventory Screening to Determine DOD responsibility – 1997
- USEPA Site Inspection – 2000
- USACE Confirmatory Sampling at MW-4 – 2002
- ARM Group Site Characterization and Risk Assessment – 2007
- ARM Group Indoor Air Sampling - 2008

The results of the early groundwater studies identified TCE in monitoring well MW-4. This is an on site well located adjacent to the old missile assembly building. The USACE in 2003 and ARM in 2007 conducted confirmatory sampling of MW-4 and did not identify TCE or any other significant levels of volatile organic compounds in the well. ARM reports that USACE abandoned MW-2, MW-3 and MW-4.

There were two dry wells on the property. One served the missile assembly building and the other the propellant building. ARM conducted a soil gas study in August 2007 which was documented in their November 2007 Report. The sub-slab samples collected in August 2007 from the missile assembly building, and the propellant building, were above EPA vapor intrusion guidelines.

In November 2007 ARM Group, Inc. submitted a Site Characterization and Risk Assessment on the site for the town of Gaithersburg. The soil gas investigation identified TCE at levels above the EPA Vapor Intrusion Guidance Criteria of 2.2 ug/m<sup>3</sup> in three of five samples.

MDE recommended further indoor air sampling at the site; in February 2008 ARM collected indoor air samples from two site buildings and found VOCs above the USEPA vapor intrusion guideline in indoor air samples collected from the barracks and the propellant handling building.

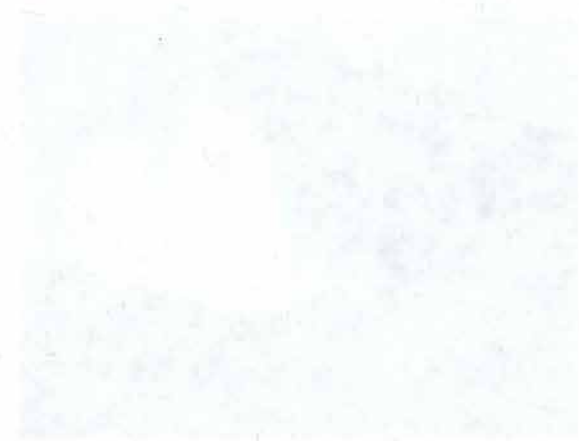
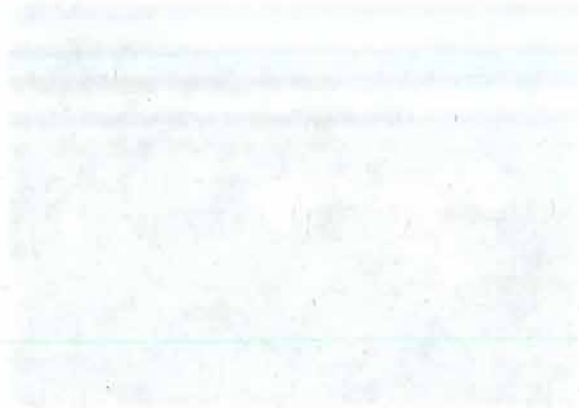
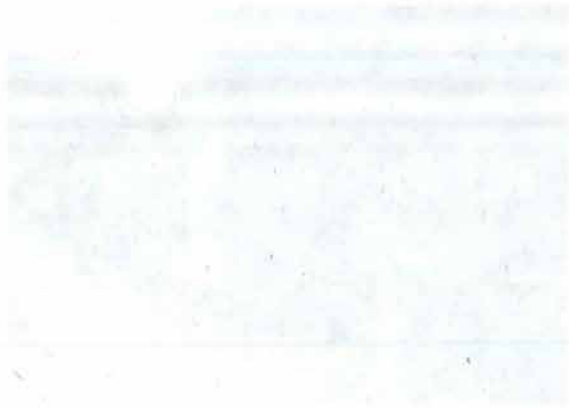
In October 2011 MDE conducted a FUDS SI of the Rockville Launch site to identify soil and groundwater contamination and to determine if further vapor intrusion studies were warranted. The SI report found minimal residual contamination of the surface and subsurface soils at the Rockville Launch site. Site observation wells were abandoned sometime prior to the October 2011 inspection. A first water bearing zone was not encountered in the any site borings therefore groundwater samples were not collected.

While TCE has been documented on the Rockville Launch site, there are no domestic wells in use in the vicinity of the site. Based on USACE findings, low levels of TCE are present in groundwater on site. ARM documented low levels of TCE in soil vapor under three site structures, the missile assembly building, the propellant handling building and the administration building. However, there is currently no evidence of contaminants at levels that could be considered significant; therefore, MDE does not believe that further action is warranted at this site.



## **APPENDIX A – SITE PHOTOGRAPHS**









Buildings on Northwest corner of property



Propellant Handling Building



Solar Test Building



Structure on Edge of Missile Silo



Former Missile Assembly Building



500 Gallon AST outside Generator Building



## **APPENDIX B – HISTORIC AIR PHOTOS**





1938 – Approximate Site Location Outlined in Red.



1951 – Approximate Site Location Outlined in Red.



1963 – Site Location Outlined in Red.





1981 –Site Location Outlined in Red.

## **APPENDIX C – LABORATORY DATA REPORTS**





## **GLOSSARY OF DATA QUALIFIER CODES (ORGANIC)**

### **CODES RELATED TO IDENTIFICATION**

(confidence concerning presence or absence of compounds)

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

NO CODE = Confirmed identification.

B = Not detected substantially above the level reported in laboratory or field blanks.

R = Unusable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.

N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

### **CODES RELATED TO QUANTITATION**

(can be used for both positive results and sample quantitation limits):

J = Analyte present. Reported value may not be accurate or precise.

K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.

L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

UL = Not detected, quantitation limit is probably higher.

### **OTHER CODES**

NJ = Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity.

Q = No analytical result.



## DATA SUMMARY FORM: INORGANIC

Page 1 of 3

Case #: 41660

SDG : MC0389

Number of Soil Samples : 15

Site :

ROCKVILLE LAUNCH

Number of Water Samples : 0

Lab. :

BONNER

Sample Number :		MC0389		MC0390		MC0391		MC0395		MC0397	
Sampling Location :		S-12		S-13		S-14		S-5		S-7	
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :		10/05/2011		10/05/2011		10/05/2011		10/05/2011		10/05/2011	
Time Sampled :		09:45		09:20		09:05		10:00		11:15	
%Solids :		82.9		80.7		83.0		82.4		96.8	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
ANALYTE	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	20	15100	J	16600	J	8490	J	25500	J	22300	J
ANTIMONY	6	1.0	J	0.79	J	0.82	J	1.2	J	0.99	J
ARSENIC	1	4.9		4.0		1.6		4.4		3.6	
BARIUM	20	75.9	J	68.0	J	25.3	J	37.3	J	38.9	J
BERYLLIUM	0.5	0.35	J	0.31	J	0.27	J	0.29	J	0.34	J
CADMIUM	0.5			0.25	J						
CALCIUM	500	880		1550		1110		436	J	215	J
CHROMIUM	1	22.1		20.4		13.8		31.9		26.8	
COBALT	5	19.5	J	13.1	J	20.3	J	6.2	J	7.5	J
COPPER	2.5	17.2	J	19.2	J	23.9	J	29.5	J	31.8	J
IRON	10	31200	J	25700	J	24600	J	40700	J	34100	J
LEAD	1	16.1	J	29.2	J	12.4	J	20.3	J	18.6	J
MAGNESIUM	500	893	J	931	J	363	J	603	J	612	J
MANGANESE	1.5	433	J	278	J	329	J	77.3	J	105	J
MERCURY	0.1	0.038	B	0.047	B	0.024	B	0.048	B	0.050	J
NICKEL	4	15.8		13.9		9.9		13.9		12.3	
POTASSIUM	500	819	J	909	J	406	J	852	J	818	J
SELENIUM	3.5	1.5	J	1.5	J	1.2	J	1.7	J	1.6	J
SILVER	1	0.63	J	0.57	J	0.48	J	1.1	J	0.94	J
SODIUM	500	251	J	67.5	J	16.3	J	900		3018	J
THALLIUM	2.5										
VANADIUM	15	35.9	J	32.7	J	24.5	J	63.4	J	48.8	J
ZINC	6	31.6	J	42.1	J	18.2	J	29.5	J	28.9	J
CYANIDE	0.5		R	0.17	B	0.28	J		R		R

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / (%Solids/ 100)

Revised 09/99



**DATA SUMMARY FORM: INORGANIC**

Page 2 of 3

Case #: 41660      SDG : MC0389  
 Site :              ROCKVILLE LAUNCH  
 Lab. :              BONNER

Sample Number :		MC0398		MC0399		MC03A0		MC03A5		MC03A6	
Sampling Location :		S-8		S-9		SD-15		SS-12		SS-13	
Field QC :						Dup. of MC03B1					
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :		10/05/2011		10/05/2011		10/05/2011		10/05/2011		10/05/2011	
Time Sampled :		10:25		10:45		10:10		09:50		09:30	
%Solids :		83.4		85.0		81.7		84.9		82.6	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
ANALYTE	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	20	16000	J	13000	J	11500	J	18500	J	19600	J
ANTIMONY	6	0.91	J	0.85	J	0.85	J	1.3	J	1.1	J
ARSENIC	1	3.0		2.5		1.4		3.3		4.1	
BARIUM	20	36.4	J	28.2	J	21.3	J	41.8	J	40.9	J
BERYLLIUM	0.5	0.26	J	0.19	J	0.46	J	0.39	J	0.42	J
CADMIUM	0.5										
CALCIUM	500	402	J	375	J	69.6	J	543	J	294	J
CHROMIUM	1	20.5		18.2		17.3		25.2		19.5	
COBALT	5	10.8	J	8.0	J	2.1	J	8.3	J	5.0	J
COPPER	2.5	22.9	J	21.9	J	16.7	J	29.5	J	22.8	J
IRON	10	29900	J	27200	J	25600	J	40000	J	34800	J
LEAD	1	14.2	J	13.3	J	14.1	J	16.5	J	14.4	J
MAGNESIUM	500	822	J	616	J	274	J	842	J	584	J
MANGANESE	1.5	115	J	93.9	J	41.1	J	134	J	59.3	J
MERCURY	0.1	0.048	B	0.047	B	0.088	J	0.028	B	0.069	J
NICKEL	4	12.5		10.2		5.2		15.6		14.3	
POTASSIUM	500	799	J	649	J	442	J	1010	J	951	J
SELENIUM	3.5	1.4	J	1.3	J	1.4	J	1.6	J	1.7	J
SILVER	1	0.78	J	0.68	J	0.67	J	1.2		0.87	J
SODIUM	500	336	J	116	J	105	J	107	J	37.0	J
THALLIUM	2.5										
VANADIUM	5	36.2	J	31.3	J	38.9	J	45.4	J	37.9	J
ZINC	6	25.8	J	21.5	J	15.5	J	26.6	J	21.6	J
CYANIDE	0.5		R		R		R		R		R

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / (%Solids/ 100)

Revised 09/99

## DATA SUMMARY FORM: INORGANIC

Page 3 of 3

Case #: 41660

SDG : MC0389

Site :

ROCKVILLE LAUNCH

Lab. :

BONNER

Sample Number :		MC03A7		MC03B1		MC03B3		MC03B4		MC03B5	
Sampling Location :		SS-14		SS-5		SS-7		SS-8		SS-9	
Field QC :				Dup. of MC03A0							
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :		10/05/2011		10/05/2011		10/05/2011		10/05/2011		10/05/2011	
Time Sampled :		09:10		10:05		11:20		10:30		10:50	
%Solids :		84.3		81.6		88.6		83.5		88.3	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
ANALYTE	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	20	15000	J	10700	J	7680	J	22700	J	21800	J
ANTIMONY	6	0.76	J	0.80	J	0.94	J	0.95	J	1.4	J
ARSENIC	1	3.7		1.3		0.76	J	4.7		3.3	
BARIUM	20	31.9	J	20.5	J	14.8	J	45.5	J	35.6	J
BERYLLIUM	0.5	0.32	J	0.42	J	0.52	J	0.22	J	0.69	
CADMIUM	0.5										
CALCIUM	500	758		69.8	J	56.4	J	494	J	369	J
CHROMIUM	1	15.7		16.6		9.5		26.9		30.7	
COBALT	5	32.6	J	2.0	J	3.4	J	10.3	J	15.8	J
COPPER	2.5	33.2	J	16.0	J	33.6	J	19.7	J	41.1	J
IRON	10	24900	J	25000	J	29200	J	32500	J	41400	J
LEAD	1	18.6	J	13.9	J	20.1	J	14.7	J	12.4	J
MAGNESIUM	500	862	J	277	J	136	J	1560	J	638	J
MANGANESE	1.5	257	J	38.7	J	69.6	J	145	J	92.3	J
MERCURY	0.1	0.034	B	0.026	B	0.038	B	0.025	B	0.036	B
NICKEL	4	14.9		5.2		4.9		17.0		15.0	
POTASSIUM	500	815	J	424	J	530	J	1110	J	817	J
SELENIUM	3.5	1.2	J	1.2	J	0.56	B	1.5	J	1.6	J
SILVER	1	0.51	J	0.50	J	0.72	J	1.1	J	1.3	
SODIUM	500	28.2	J	106	J	23.3	J	144	J	59.8	J
THALLIUM	2.5										
VANADIUM	5	26.8	J	36.7	J	23.8	J	46.9	J	43.6	J
ZINC	6	31.1	J	14.6	J	12.8	J	38.5	J	25.2	J
CYANIDE	0.5		R		R		R		R		R

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / (%Solids/ 100)

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## DATA SUMMARY FORM: INORGANIC

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Case #: 41660

SDG : MC0387

Number of Soil Samples : 15

Site :

ROCKVILLE LAUNCH

Number of Water Samples : 0

Lab. :

BONNER

Sample Number :		MC0386		MC0387		MC0388		MC0392		MC0393	
Sampling Location :		S-1		S-10		S-11		S-2		S-3	
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :		10/04/2011		10/04/2011		10/04/2011		10/04/2011		10/04/2011	
Time Sampled :		10:00		11:35		14:13		14:40		14:10	
%Solids :		83.0		82.9		81.3		79.9		83.3	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
ANALYTE	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	20	12800	J	14600	J	18800	J	14600	J	13300	J
ANTIMONY	6	1.2	B	0.80	B	1.1	B	1.1	B	0.80	B
ARSENIC	1	4.6		3.4		4.3		4.0		4.3	
BARIUM	20	66.3	J	52.6	J	56.8	J	60.5	J	77.0	J
BERYLLIUM	0.5	0.45	J	0.33	J	0.46	J	0.42	J	0.28	J
CADMIUM	0.5		UL		UL		UL	0.079	J		UL
CALCIUM	500	444	J	145	J	189	J	856	J	448	J
CHROMIUM	1	20.5	L	17.4	L	23.7	L	18.8	L	24.1	L
COBALT	5	14.0		18.9		11.2		17.5		23.2	
COPPER	2.5	12.3	J	17.0	J	20.9	J	21.5	J	16.0	J
IRON	10	27300	J	22300	J	30200	J	27100	J	22500	J
LEAD	1	17.0	K	24.2	K	21.2	K	25.4	K	75.1	K
MAGNESIUM	500	838	J	1760	J	863	J	790	J	1050	J
MANGANESE	1.5	558	J	242	J	217	J	293	J	370	J
MERCURY	0.1	0.14		0.099	J	0.13		0.12	J	0.17	
NICKEL	4	16.6		21.9		16.2		15.2		18.2	
POTASSIUM	500	760	J	719	J	1110	J	891	J	775	J
SELENIUM	3.5	0.98	B	0.71	B	1.3	B	1.2	B	0.88	B
SILVER	1	0.96	B	0.78	B	1.2	B	0.93	B	0.80	B
SODIUM	500	26.7	J	20.5	B	30.1	J	66.3	J	26.0	J
THALLIUM	2.5	0.48	J			0.28	J				
VANADIUM	5	34.9	J	31.5	J	43.5	J	33.5	J	25.8	J
ZINC	6	39.8		53.5		87.4		56.2		110	
CYANIDE	0.5	0.33	B	0.42	B			0.35	B	1.4	B

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / (%Solids/ 100)

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**DATA SUMMARY FORM: INORGANIC**

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Case #: 41660      SDG : MC0387  
 Site :              ROCKVILLE LAUNCH  
 Lab. :              BONNER

Sample Number :		MC0394		MC0396		MC03A1		MC03A2		MC03A3	
Sampling Location :		S-4		S-6		SD-16		SS-1		SS-10	
Field QC :						Dup. of MC03A3				Dup. of MC03A1	
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :		10/04/2011		10/04/2011		10/04/2011		10/04/2011		10/04/2011	
Time Sampled :		13:40		12:05		11:45		10:05		11:40	
%Solids :		80.8		76.3		82.1		80.3		82.1	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
ANALYTE	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	20	15400	J	9820	J	19200	J	17000	J	20200	J
ANTIMONY	6	1.0	B	0.92	B	1.0	B	1.3	B	0.90	B
ARSENIC	1	3.8		2.8		2.0		4.8		2.1	
BARIUM	20	53.7	J	42.0	J	25.0	J	45.2	J	26.5	J
BERYLLIUM	0.5	0.30	J	0.30	J	0.24	J	0.44	J	0.26	J
CADMIUM	0.5		UL		UL		UL		UL		UL
CALCIUM	500	786	J	405	J	46.0	J	297	J	50.3	J
CHROMIUM	1	20.4	L	12.5	L	25.5	L	28.5	L	27.1	L
COBALT	5	11.2		24.2		7.1		17.2		5.0	J
COPPER	2.5	13.5	J	19.5	J	16.1	J	20.5	J	16.4	J
IRON	10	25400	J	20900	J	28200	J	34700	J	28300	J
LEAD	1	26.1	K	20.0	K	20.8	K	11.9	K	20.9	K
MAGNESIUM	500	914	J	582	J	269	J	1210	J	257	J
MANGANESE	1.5	207	J	345	J	41.2	J	173	J	40.3	J
MERCURY	0.1	0.15		0.12	J	0.10	J	0.082	J	0.091	J
NICKEL	4	12.3		12.5		11.1		15.6		12.1	
POTASSIUM	500	928	J	670	J	356	J	861	J	347	J
SELENIUM	3.5	0.94	B	1.0	B	0.85	B	1.0	B	0.84	B
SILVER	1	0.92	B	0.70	B	0.89	B	1.3	B	0.96	B
SODIUM	500	38.4	J	19.5	B	13.9	B	25.9	J	19.4	B
THALLIUM	2.5	0.36	J					0.37	J	0.16	J
VANADIUM	5	36.5	J	23.7	J	49.4	J	41.1	J	49.8	J
ZINC	6	34.1		47.4		18.6		37.2		18.8	
CYANIDE	0.5	0.28	B	0.29	B			0.38	B	0.35	B

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / (%Solids/ 100)

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## DATA SUMMARY FORM: INORGANIC

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Case #: 41660

SDG : MC0387

Site :

ROCKVILLE LAUNCH

Lab. :

BONNER

Sample Number :		MC03A4		MC03A8		MC03A9		MC03B0		MC03B2	
Sampling Location :		SS-11		SS-2		SS-3		SS-4		SS-6	
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :		10/04/2011		10/04/2011		10/04/2011		10/04/2011		10/04/2011	
Time Sampled :		14:17		14:45		14:20		13:45		12:10	
%Solids :		81.4		84.8		87.3		82.2		82.6	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
ANALYTE	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	20	27900	J	26900	J	12200	J	22900	J	20200	J
ANTIMONY	6	1.3	B	1.2	B	0.52	B	1.6	B	1.5	B
ARSENIC	1	4.3		4.6		1.5		4.3		4.8	
BARIUM	20	65.3	J	35.8	J	21.1	J	52.5	J	50.8	J
BERYLLIUM	0.5	0.46	J	0.49	J	0.21	J	0.53	J	0.40	J
CADMIUM	0.5		UL		UL		UL		UL		UL
CALCIUM	500	274	J	467	J	214	J	125	J	573	J
CHROMIUM	1	29.9	L	16.9	L	7.0	L	27.7	L	27.4	L
COBALT	5	14.4		8.0		48.0		6.3		12.1	
COPPER	2.5	25.0	J	41.0	J	59.8	J	32.3	J	25.0	J
IRON	10	36300	J	30700	J	16500	J	41200	J	38800	J
LEAD	1	17.3	K	13.8	K	17.4	K	23.6	K	15.6	K
MAGNESIUM	500	876	J	471	J	1050	J	736	J	808	J
MANGANESE	1.5	197	J	77.5	J	678	J	109	J	185	J
MERCURY	0.1	0.11	J	0.11	J	0.095	J	0.11	J	0.095	J
NICKEL	4	17.4		16.5		23.3		15.1		18.5	
POTASSIUM	500	1280	J	717	J	473	J	959	J	1090	J
SELENIUM	3.5	1.2	B	0.91	B	0.78	B	1.0	B	1.4	B
SILVER	1	1.1	B	0.87	B	0.35	B	1.3	B	1.2	B
SODIUM	500	34.1	J	47.1	J	11.0	B	38.8	J	30.4	J
THALLIUM	2.5	0.32	J							0.30	J
VANADIUM	5	59.6	J	33.8	J	13.4	J	58.8	J	49.8	J
ZINC	6	42.4		23.2		45.3		28.0		31.1	
CYANIDE	0.5	0.25	B			0.27	B	0.34	B	0.18	B

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / (%Solids/ 100)

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**Number of Soil Samples : 9**

Number of Water Samples : 1

## DATA C

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## DATA SUMMARY FORM: Volatiles

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Case #: 41660

SDG : C0385

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :	C03A1	C02A2	C03A3	C03A4	C03A8						
Sampling Location :	SD-16	SS-1	SS-10	SS-11	SS-2						
Field QC:	Field Dup. of C03A3		Field Dup. of C03A1								
Matrix :	Soil	Soil	Soil	Soil	Soil						
Units :	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg						
Date Sampled :	10/04/2011	10/04/2011	10/04/2011	10/04/2011	10/04/2011						
Time Sampled :	11:45	10:05	11:40	14:17	14:45						
%Moisture :	17.7	20.8	17.9	18.5	16.5						
Dilution Factor :	0.82	1.52	0.78	0.96	0.75						
Volatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,1,2-Trichloroethane	5.0										
Tetrachloroethene	5.0										
2-Hexanone	10										
Dibromochloromethane	5.0										
1,2-Dibromoethane	5.0										
Chlorobenzene	5.0										
Ethylbenzene	5.0										
o-Xylene	5.0			0.45	J						
m,p-Xylene	5.0										
Styrene	5.0										
Bromoform	5.0										
Isopropylbenzene	5.0										
1,1,2,2-Tetrachloroethane	5.0										
1,3-Dichlorobenzene	5.0										
1,4-Dichlorobenzene	5.0										
1,2-Dichlorobenzene	5.0										
1,2-Dibromo-3-chloropropane	5.0										
1,2,4-Trichlorobenzene	5.0										
1,2,3-Trichlorobenzene	5.0										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / [(100 - %Moisture) / 100]

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## DATA SUMMARY FORM: Volatiles

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Case #: 41660

SDG : C0385

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :	C03A9	C03B0	C03B2	C03B6							
Sampling Location :	SS-3	SS-4	SS-6	SD-6							
Field QC:											
Matrix :	Soil	Soil	Soil	Soil							
Units :	ug/Kg	ug/Kg	ug/Kg	ug/Kg							
Date Sampled :	10/04/2011	10/04/2011	10/04/2011	10/04/2011							
Time Sampled :	14:20	13:45	12:10	13:30							
%Moisture :	12.7	17.9	19.3	19.5							
Dilution Factor :	0.86	0.96	0.76	0.77							
Volatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,1,2-Trichloroethane	5.0										
Tetrachloroethene	5.0										
2-Hexanone	10										
Dibromochloromethane	5.0										
1,2-Dibromoethane	5.0										
Chlorobenzene	5.0										
Ethylbenzene	5.0										
o-Xylene	5.0										
m,p-Xylene	5.0										
Styrene	5.0										
Bromoform	5.0										
Isopropylbenzene	5.0										
1,1,2,2-Tetrachloroethane	5.0										
1,3-Dichlorobenzene	5.0										
1,4-Dichlorobenzene	5.0										
1,2-Dichlorobenzene	5.0										
1,2-Dibromo-3-chloropropane	5.0										
1,2,4-Trichlorobenzene	5.0										
1,2,3-Trichlorobenzene	5.0										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits:  $(CRQL * Dilution Factor) / [(100 - \%Moisture) / 100]$ 

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## DATA SUMMARY FORM: Volatiles

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Case #: 41660

SDG : C0385

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C0385							
Sampling Location :		GW-7							
Field QC:		Trip Blank							
Matrix :		Aqueous							
Units :		ug/L							
Date Sampled :		10/04/2011							
Time Sampled :		11:05							
Dilution Factor :		1.0							
Volatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Dichlorodifluoromethane	5.0								
Chloromethane	5.0								
Vinyl chloride	5.0								
Bromomethane	5.0								
Chloroethane	5.0								
Trichlorofluoromethane	5.0								
1,1-Dichloroethene	5.0								
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0								
Acetone	10	23	J						
Carbon Disulfide	5.0								
Methyl acetate	5.0								
Methylene chloride	5.0	2.1	J						
trans-1,2-Dichloroethene	5.0								
Methyl tert-butyl ether	5.0								
1,1-Dichloroethane	5.0								
cis-1,2-Dichloroethene	5.0								
2-Butanone	10								
Bromochloromethane	5.0								
Chloroform	5.0								
1,1,1-Trichloroethane	5.0								
Cyclohexane	5.0								
Carbon tetrachloride	5.0								
Benzene	5.0								
1,2-Dichloroethane	5.0								
1,4-Dioxane	100		R						
Trichloroethene	5.0								
Methylcyclohexane	5.0								
1,2-Dichloropropane	5.0								
Bromodichloromethane	5.0								
cis-1,3-Dichloropropene	5.0								
4-Methyl-2-pentanone	10								
Toluene	5.0								
trans-1,3-Dichloropropene	5.0								

## DATA SUMMARY FORM: Volatiles

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Case #: 41660

SDG : C0385

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C0385									
Sampling Location :		GW-7									
Field QC:		Trip Blank									
Matrix :		Aqueous									
Units :		ug/L									
Date Sampled :		10/04/2011									
Time Sampled :		11:05									
Dilution Factor :		1.0									
Volatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,1,2-Trichloroethane	5.0										
Tetrachloroethene	5.0										
2-Hexanone	10										
Dibromochloromethane	5.0										
1,2-Dibromoethane	5.0										
Chlorobenzene	5.0										
Ethylbenzene	5.0										
o-Xylene	5.0										
m,p-Xylene	5.0										
Styrene	5.0										
Bromoform	5.0										
Isopropylbenzene	5.0										
1,1,2,2-Tetrachloroethane	5.0										
1,3-Dichlorobenzene	5.0										
1,4-Dichlorobenzene	5.0										
1,2-Dichlorobenzene	5.0										
1,2-Dibromo-3-chloropropane	5.0										
1,2,4-Trichlorobenzene	5.0										
1,2,3-Trichlorobenzene	5.0										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits:  $(CRQL * Dilution Factor) / [(100 - \%Moisture) / 100]$ 

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## DATA SUMMARY FORM: BNA

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Case #: 41660

SDG : C0385

Number of Soil Samples : 15

Site :

ROCKVILLE LAUNCH

Number of Water Samples : 0

Lab. :

DATAC

Sample Number :		C0386		C0387		C0388		C0392		C0393	
Sampling Location :		S-1		S-10		S-11		S-2		S-3	
Field QC:											
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/04/2011		10/04/2011		10/04/2011		10/04/2011		10/04/2011	
Time Sampled :		10:00		11:35		14:13		14:40		14:10	
%Moisture :		17.5		17.4		21.7		17.8		17.7	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Benzaldehyde	170	75	B	34	B	120	J	92	J	140	J
Phenol	170	29	B	20	B	17	B	14	B	21	B
Bis(2-Chloroethyl)ether	170										
2-Chlorophenol	170										
2-Methylphenol	170										
2,2'-Oxybis(1-chloropropane)	170										
Acetophenone	170	65	B	50	B	70	B	63	B	87	B
4-Methylphenol	170										
N-Nitroso-di-n-propylamine	170										
Hexachloroethane	170										
Nitrobenzene	170										
Isophorone	170										
2-Nitrophenol	170										
2,4-Dimethylphenol	170										
Bis(2-chloroethoxy)methane	170										
2,4-Dichlorophenol	170										
Naphthalene	170							27	J	6.6	J
4-Chloroaniline	170										
Hexachlorobutadiene	170										
Caprolactam	170										
4-Chloro-3-methylphenol	170										
2-Methylnaphthalene	170							8.4	J		
Hexachlorocyclopentadiene	170										
2,4,6-Trichlorophenol	170										
2,4,5-Trichlorophenol	170										
1,1'-Biphenyl	170										
2-Chloronaphthalene	170										
2-Nitroaniline	330										
Dimethylphthalate	170										
2,6-Dinitrotoluene	170										
Acenaphthylene	170										
3-Nitroaniline	330										
Acenaphthene	170							34	J		

## DATA SUMMARY FORM: BNA

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Case #: 41660

SDG : C0385

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C0386		C0387		C0388		C0392		C0393	
Sampling Location :		S-1		S-10		S-11		S-2		S-3	
Field QC:											
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/04/2011		10/04/2011		10/04/2011		10/04/2011		10/04/2011	
Time Sampled :		10:00		11:35		14:13		14:40		14:10	
%Moisture :		17.5		17.4		21.7		17.8		17.7	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-Dinitrophenol	330										
4-Nitrophenol	330										
Dibenzofuran	170							19	J		
2,4-Dinitrotoluene	170										
Diethylphthalate	170										
Fluorene	170							23	J		
4-Chlorophenyl-phenylether	170										
4-Nitroaniline	330										
4,6-Dinitro-2-methylphenol	330										
N-Nitrosodiphenylamine	170										
1,2,4,5-Tetrachlorobenzene	170										
4-Bromophenyl-phenylether	170										
Hexachlorobenzene	170										
Atrazine	170										
Pentachlorophenol	330									43	J
Phenanthrene	170	6.5	J	26	J	7.0	J	370		12	J
Anthracene	170			6.4	J			57	J		
Carbazole	170							61	J		
Di-n-butylphthalate	170			8.2	B	7.5	B			6.9	B
Fluoranthene	170	9.9	J	35	J	12	J	570		12	J
Pyrene	170	9.4	J	30	J	13	J	410		12	J
Butylbenzylphthalate	170	9.6	J			44	J				
3,3'-Dichlorobenzidine	170										
Benzo(a)anthracene	170	7.9	J	16	J	9.7	J	290		9.8	J
Chrysene	170			12	J	7.5	J	310		7.6	J
Bis(2-ethylhexyl)phthalate	170			15	B	15	B	19	B	13	B
Di-n-octylphthalate	170										
Benzo(b)fluoranthene	170	6.5	J	14	J			380		10	J
Benzo(k)fluoranthene	170							120	J		
Benzo(a)pyrene	170			10	J			250			
Indeno(1,2,3-cd)pyrene	170			6.9	J			220			
Dibenzo(a,h)anthracene	170							53	J		
Benzo(g,h,i)perylene	170							10	J		
2,3,4,6-Tetrachlorophenol	170										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / [(100 - %Moisture) / 100]

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## DATA SUMMARY FORM: BNA

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Case #: 41660

SDG : C0385

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :	C0394	C0396	C03A1	C02A2	C03A3						
Sampling Location :	S-4	S-6	SD-16	SS-1	SS-10						
Field QC:			Field Dup. of C03A3		Field Dup. of C03A1						
Matrix :	Soil	Soil	Soil	Soil	Soil						
Units :	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg						
Date Sampled :	10/04/2011	10/04/2011	10/04/2011	10/04/2011	10/04/2011						
Time Sampled :	13:40	12:05	11:45	10:05	11:40						
%Moisture :	18.3	24.0	17.7	20.8	17.9						
Dilution Factor :	1.0	1.0	1.0	1.0	1.0						
Semivolatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Benzaldehyde	170	130	J	34	B	67	B	90	B	23	B
Phenol	170	18	B	20	B	26	B	33	B	16	B
Bis(2-Chloroethyl)ether	170										
2-Chlorophenol	170										
2-Methylphenol	170										
2,2'-Oxybls(1-chloropropane)	170										
Acetophenone	170	100	B	52	B	82	B	100	B	30	B
4-Methylphenol	170										
N-Nitroso-di-n-propylamine	170										
Hexachloroethane	170										
Nitrobenzene	170										
Isophorone	170										
2-Nitrophenol	170										
2,4-Dimethylphenol	170										
Bis(2-chloroethoxy)methane	170										
2,4-Dichlorophenol	170										
Naphthalene	170										
4-Chloroaniline	170										
Hexachlorobutadiene	170										
Caprolactam	170										
4-Chloro-3-methylphenol	170										
2-Methylnaphthalene	170										
Hexachlorocyclopentadiene	170										
2,4,6-Trichlorophenol	170										
2,4,5-Trichlorophenol	170										
1,1'-Biphenyl	170										
2-Chloronaphthalene	170										
2-Nitroaniline	330										
Dimethylphthalate	170										
2,6-Dinitrotoluene	170										
Acenaphthylene	170										
3-Nitroaniline	330										
Acenaphthene	170	6.7	J								

## DATA SUMMARY FORM: BNA

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Case #: 41660

SDG : C0385

Site :

ROCKVILLE LAUNCH

Lab.:

DATAC

Sample Number :		C0394		C0396		C03A1		C02A2		C03A3	
Sampling Location :		S-4		S-6		SD-16		SS-1		SS-10	
Field QC:						Field Dup. of C03A3				Field Dup. of C03A1	
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/04/2011		10/04/2011		10/04/2011		10/04/2011		10/04/2011	
Time Sampled :		13:40		12:05		11:45		10:05		11:40	
%Moisture :		18.3		24.0		17.7		20.8		17.9	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-Dinitrophenol	330										
4-Nitrophenol	330										
Dibenzofuran	170										
2,4-Dinitrotoluene	170										
Diethylphthalate	170										
Fluorene	170										
4-Chlorophenyl-phenylether	170										
4-Nitroaniline	330										
4,6-Dinitro-2-methylphenol	330										
N-Nitrosodiphenylamine	170										
1,2,4,5-Tetrachlorobenzene	170										
4-Bromophenyl-phenylether	170										
Hexachlorobenzene	170										
Atrazine	170										
Pentachlorophenol	330										
Phenanthrene	170	44	J								
Anthracene	170	12	J								
Carbazole	170	6.2	J								
Di-n-butylphthalate	170			8.2	B			7.5	B	6.4	B
Fluoranthene	170	55	J	11	J						
Pyrene	170	46	J	12	J						
Butylbenzylphthalate	170										
3,3'-Dichlorobenzidine	170										
Benzo(a)anthracene	170	32	J	9.1	J						
Chrysene	170	27	J	6.8	J						
Bis(2-ethylhexyl)phthalate	170	12	B	22	B	29	B	19	B	16	B
Di-n-octylphthalate	170										
Benzo(b)fluoranthene	170	33	J								
Benzo(k)fluoranthene	170	12	J								
Benzo(a)pyrene	170	26	J								
Indeno(1,2,3-cd)pyrene	170	25	J								
Dibenzo(a,h)anthracene	170										
Benzo(g,h,i)perylene	170										
2,3,4,6-Tetrachlorophenol	170										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / [(100 - %Moisture) / 100]

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SDG : C0385

## ROCKVILLE LAUNCH

**DATA C**

[illegible]

## DATA SUMMARY FORM: BNA

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Case #: 41660

SDG : C0385

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C03A4		C03A8		C03A9		C03B0		C03B2	
Sampling Location :		SS-11		SS-2		SS-3		SS-4		SS-6	
Field QC:											
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/04/2011		10/04/2011		10/04/2011		10/04/2011		10/04/2011	
Time Sampled :		14:17		14:45		14:20		13:45		12:10	
%Moisture :		18.5		16.5		12.7		17.9		19.3	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-Dinitrophenol	330										
4-Nitrophenol	330										
Dibenzofuran	170										
2,4-Dinitrotoluene	170										
Diethylphthalate	170	6.8	J								
Fluorene	170										
4-Chlorophenyl-phenylether	170										
4-Nitroaniline	330										
4,6-Dinitro-2-methylphenol	330				R						
N-Nitrosodiphenylamine	170										
1,2,4,5-Tetrachlorobenzene	170										
4-Bromophenyl-phenylether	170										
Hexachlorobenzene	170										
Atrazine	170										
Pentachlorophenol	330										
Phenanthrene	170										
Anthracene	170										
Carbazole	170										
Di-n-butylphthalate	170	7.8	B								
Fluoranthene	170				UL				UL		UL
Pyrene	170				UL				UL		UL
Butylbenzylphthalate	170										
3,3'-Dichlorobenzidine	170		R								
Benzo(a)anthracene	170				UL				UL		UL
Chrysene	170				UL				UL		UL
Bis(2-ethylhexyl)phthalate	170	24	B	9.7	B	8.8	B	9.4	B	9.8	B
Di-n-octylphthalate	170										
Benzo(b)fluoranthene	170										
Benzo(k)fluoranthene	170										
Benzo(a)pyrene	170										
Indeno(1,2,3-cd)pyrene	170										
Dibenzo(a,h)anthracene	170										
Benzo(g,h,i)perylene	170										
2,3,4,6-Tetrachlorophenol	170										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / [(100 - %Moisture) / 100]

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## DATA SUMMARY FORM: Pesticides

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Case #: 41660

SDG : C0385

Number of Soil Samples : 15

Site :

ROCKVILLE LAUNCH

Number of Water Samples : 0

Lab. :

DATAC

Sample Number :		C0386		C0387		C0388		C0392		C0393	
Sampling Location :		S-1		S-10		S-11		S-2		S-3	
Field QC:											
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/04/2011		10/04/2011		10/04/2011		10/04/2011		10/04/2011	
Time Sampled :		10:00		11:35		14:13		14:40		14:10	
%Moisture :		17.5		17.4		21.7		17.8		17.7	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0/10.0	
Pesticide Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	1.7										
beta-BHC	1.7			0.21	B					0.33	B
delta-BHC	1.7										
gamma-BHC (Lindane)	1.7					0.71	J				
Heptachlor	1.7					0.49	J			0.096	J
Aldrin	1.7					0.30	J				
Heptachlor epoxide	1.7									0.23	J
Endosulfan I	1.7					0.59	J				
Dieldrin	3.3					0.17	J			0.28	J
4,4'-DDE	3.3			0.18	J	1.0	J	1.2	J	120+	
Endrin	3.3					0.47	J			0.93	J
Endosulfan II	3.3					0.24	J			0.94	J
4,4'-DDD	3.3							0.31	J	6.5	J
Endosulfan sulfate	3.3									1.1	J
4,4'-DDT	3.3	0.12	J	0.40	J	6.8	J	2.4	J	410+	
Methoxychlor	17			1.4	J	0.59	J				
Endrin ketone	3.3			0.24	J	1.3	J	0.80	J		
Endrin aldehyde	3.3										
alpha-Chlordane	1.7					0.040	J			0.28	J
gamma-Chlordane	1.7					0.16	J			0.44	J
Toxaphene	170										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits:  $(CRQL * Dilution Factor) / [(100 - \%Moisture) / 100]$ 

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+ = Result reported from the diluted analysis.

## DATA SUMMARY FORM: Pesticides

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Case #: 41660

SDG : C0385

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C0394		C0396		C03A1		C02A2		C03A3	
Sampling Location :		S-4		S-6		SD-16		SS-1		SS-10	
Field QC:						Field Dup. of C03A3				Field Dup. of C03A1	
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/04/2011		10/04/2011		10/04/2011		10/04/2011		10/04/2011	
Time Sampled :		13:40		12:05		11:45		10:05		11:40	
%Moisture :		18.3		24.0		17.7		20.8		17.9	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Pesticide Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	1.7										
beta-BHC	1.7	0.046	B	0.054	B					0.17	B
delta-BHC	1.7										
gamma-BHC (Lindane)	1.7										
Heptachlor	1.7										
Aldrin	1.7										
Heptachlor epoxide	1.7			0.13	J			0.70	J		
Endosulfan I	1.7										
Dieldrin	3.3										
4,4'-DDE	3.3	2.0	J	1.3	J						
Endrin	3.3	0.19	J	0.12	J						
Endosulfan II	3.3	0.21	J								
4,4'-DDD	3.3										
Endosulfan sulfate	3.3										
4,4'-DDT	3.3	2.7	J	0.71	J						
Methoxychlor	17										
Endrin ketone	3.3							0.34	J		
Endrin aldehyde	3.3										
alpha-Chlordane	1.7										
gamma-Chlordane	1.7										
Toxaphene	170										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits:  $(CRQL * Dilution Factor) / [(100 - \%Moisture) / 100]$ 

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## DATA SUMMARY FORM: Pesticides

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Case #: 41660

SDG : C0385

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C03A4		C03A8		C03A9		C03B0		C03B2	
Sampling Location :		SS-11		SS-2		SS-3		SS-4		SS-6	
Field QC:											
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/04/2011		10/04/2011		10/04/2011		10/04/2011		10/04/2011	
Time Sampled :		14:17		14:45		14:20		13:45		12:10	
%Moisture :		18.5		16.5		12.7		17.9		19.3	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Pesticide Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	1.7			0.091	J						
beta-BHC	1.7	0.24	B	0.17	B			0.15	B	0.14	B
delta-BHC	1.7										
gamma-BHC (Lindane)	1.7			0.17	J						
Heptachlor	1.7										
Aldrin	1.7	0.40	J	0.75	J	0.18	J	0.55	J	0.47	J
Heptachlor epoxide	1.7										
Endosulfan I	1.7										
Dieldrin	3.3										
4,4'-DDE	3.3										
Endrin	3.3										
Endosulfan II	3.3										
4,4'-DDD	3.3										
Endosulfan sulfate	3.3										
4,4'-DDT	3.3	0.17	J			0.23	J	0.37	J		
Methoxychlor	17	1.7	J					0.80	J		
Endrin ketone	3.3	0.24	J			0.32	J				
Endrin aldehyde	3.3										
alpha-Chlordane	1.7										
gamma-Chlordane	1.7										
Toxaphene	170										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / [(100 - %Moisture) / 100]

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## DATA SUMMARY FORM: Aroclor

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Case #: 41660

SDG : C0385

Number of Soil Samples : 15

Site :

ROCKVILLE LAUNCH

Number of Water Samples : 0

Lab. :

DATAC

Sample Number :	C0386	C0387	C0388	C0392	C0393						
Sampling Location :	S-1	S-10	S-11	S-2	S-3						
Field QC:											
Matrix :	Soil	Soil	Soil	Soil	Soil						
Units :	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg						
Date Sampled :	10/04/2011	10/04/2011	10/04/2011	10/04/2011	10/04/2011						
Time Sampled :	10:00	11:35	14:13	14:40	14:10						
%Moisture :	17.5	17.4	21.7	17.8	17.7						
Dilution Factor :	1.0	1.0	1.0	1.0	1.0						
Aroclor Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Aroclor-1016	33										
Aroclor-1221	33										
Aroclor-1232	33										
Aroclor-1242	33										
Aroclor-1248	33										
Aroclor-1254	33										
Aroclor-1260	33					67	J				
Aroclor-1262	33										
Aroclor-1268	33										

Sample Number :		C0394	C0396	C03A1	C02A2	C03A3			
Sampling Location :		S-4	S-6	SD-16	SS-1	SS-10			
Field QC:				Field Dup. of C03A3		Field Dup. of C03A1			
Matrix :		Soil	Soil	Soil	Soil	Soil			
Units :		ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg			
Date Sampled :		10/04/2011	10/04/2011	10/04/2011	10/04/2011	10/04/2011			
Time Sampled :		13:40	12:05	11:45	10:05	11:40			
%Moisture :		18.3	24.0	17.7	20.8	17.9			
Dilution Factor :		1.0	1.0	1.0	1.0	1.0			
Aroclor Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Aroclor-1016	33								
Aroclor-1221	33								
Aroclor-1232	33								
Aroclor-1242	33								
Aroclor-1248	33								
Aroclor-1254	33								
Aroclor-1260	33								
Aroclor-1262	33								
Aroclor-1268	33								

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / [(100 - %Moisture) / 100]

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## DATA SUMMARY FORM: Aroclor

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Case #: 41660

SDG : C0385

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C03A4		C03A8		C03A9		C03B0		C03B2	
Sampling Location :		SS-11		SS-2		SS-3		SS-4		SS-6	
Field QC:											
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/04/2011		10/04/2011		10/04/2011		10/04/2011		10/04/2011	
Time Sampled :		14:17		14:45		14:20		13:45		12:10	
%Moisture :		18.5		16.5		12.7		17.9		19.3	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Aroclor Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Aroclor-1016	33										
Aroclor-1221	33										
Aroclor-1232	33										
Aroclor-1242	33										
Aroclor-1248	33										
Aroclor-1254	33										
Aroclor-1260	33										
Aroclor-1262	33										
Aroclor-1268	33										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits:  $(CRQL * Dilution Factor) / [(100 - \%Moisture) / 100]$ 

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**Appendix C**

**Chain of Custody (COC) Records**



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**Number of Soil Samples : 8**

Number of Water Samples : 1

**DATA C**

[illegible]

## DATA SUMMARY FORM: Volatiles

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Case #: 41660

SDG : C0384

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C03A0		C03A5		C03A6		C03A7		C03B1		
Sampling Location :		SD-15		SS-12		SS-13		SS-14		SS-5		
Field QC:		Field Dup. of C03B1								Field Dup. of C03A0		
Matrix :		Soil		Soil		Soil		Soil		Soil		
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		
Date Sampled :		10/05/2011		10/05/2011		10/05/2011		10/05/2011		10/05/2011		
Time Sampled :		10:10		09:50		09:30		09:10		10:05		
%Moisture :		17.7		18.6		16.7		16.2		19.1		
Dilution Factor :		0.85		0.83		0.76		0.82		0.89		
Volatile Compound		CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,1,2-Trichloroethane		5.0										
Tetrachloroethene		5.0										
2-Hexanone		10										
Dibromochloromethane		5.0										
1,2-Dibromoethane		5.0										
Chlorobenzene		5.0										
Ethylbenzene		5.0										
o-Xylene		5.0										
m,p-Xylene		5.0									0.19	J
Styrene		5.0										
Bromoform		5.0										
Isopropylbenzene		5.0										
1,1,2,2-Tetrachloroethane		5.0										
1,3-Dichlorobenzene		5.0										
1,4-Dichlorobenzene		5.0										
1,2-Dichlorobenzene		5.0										
1,2-Dibromo-3-chloropropane		5.0										
1,2,4-Trichlorobenzene		5.0										
1,2,3-Trichlorobenzene		5.0										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits:  $(CRQL * Dilution Factor) / [(100 - \%Moisture) / 100]$ 

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## DATA SUMMARY FORM: Volatiles

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Case #: 41660

SDG : C0384

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C03B3		C03B4		C03B5			
Sampling Location :		SS-7		SS-8		SS-9			
Field QC:									
Matrix :		Soil		Soil		Soil			
Units :		ug/Kg		ug/Kg		ug/Kg			
Date Sampled :		10/05/2011		10/05/2011		10/05/2011			
Time Sampled :		11:20		10:30		10:50			
%Moisture :		12.6		15.7		18.9			
Dilution Factor :		1.02		0.76		0.75			
Volatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Dichlorodifluoromethane	5.0								
Chloromethane	5.0								
Vinyl chloride	5.0								
Bromomethane	5.0								
Chloroethane	5.0								
Trichlorofluoromethane	5.0								
1,1-Dichloroethene	5.0								
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0								
Acetone	10								
Carbon Disulfide	5.0								
Methyl acetate	5.0								
Methylene chloride	5.0	0.88	B	0.55	B	0.61	B		
trans-1,2-Dichloroethene	5.0								
Methyl tert-butyl ether	5.0								
1,1-Dichloroethane	5.0								
cis-1,2-Dichloroethene	5.0								
2-Butanone	10								
Bromochloromethane	5.0								
Chloroform	5.0								
1,1,1-Trichloroethane	5.0								
Cyclohexane	5.0								
Carbon tetrachloride	5.0								
Benzene	5.0								
1,2-Dichloroethane	5.0								
1,4-Dioxane	100		R		R		R		
Trichloroethene	5.0			1.0	J				
Methylcyclohexane	5.0								
1,2-Dichloropropane	5.0								
Bromodichloromethane	5.0								
cis-1,3-Dichloropropene	5.0								
4-Methyl-2-pentanone	10			0.21	J				
Toluene	5.0								
trans-1,3-Dichloropropene	5.0								

## DATA SUMMARY FORM: Volatiles

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Case #: 41660

SDG : C0384

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :	C03B3	C03B4	C03B5								
Sampling Location :	SS-7	SS-8	SS-9								
Field QC:											
Matrix :	Soil	Soil	Soil								
Units :	ug/Kg	ug/Kg	ug/Kg								
Date Sampled :	10/05/2011	10/05/2011	10/05/2011								
Time Sampled :	11:20	10:30	10:50								
%Moisture :	12.6	15.7	18.9								
Dilution Factor :	1.02	0.76	0.75								
Volatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,1,2-Trichloroethane	5.0										
Tetrachloroethene	5.0										
2-Hexanone	10										
Dibromochloromethane	5.0										
1,2-Dibromoethane	5.0										
Chlorobenzene	5.0										
Ethylbenzene	5.0										
o-Xylene	5.0										
m,p-Xylene	5.0	0.14	J	0.16	J	0.12	J				
Styrene	5.0										
Bromoform	5.0										
Isopropylbenzene	5.0										
1,1,2,2-Tetrachloroethane	5.0										
1,3-Dichlorobenzene	5.0										
1,4-Dichlorobenzene	5.0										
1,2-Dichlorobenzene	5.0										
1,2-Dibromo-3-chloropropane	5.0										
1,2,4-Trichlorobenzene	5.0										
1,2,3-Trichlorobenzene	5.0										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits:  $(CRQL * Dilution Factor) / [(100 - \%Moisture) / 100]$ 

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## DATA SUMMARY FORM: Volatiles

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Case #: 41660

SDG : C0384

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C0384							
Sampling Location :		GW-6							
Field QC:		Trip Blank							
Matrix :		Aqueous							
Units :		ug/L							
Date Sampled :		10/05/2011							
Time Sampled :		11:40							
pH:		1							
Dilution Factor :		1.0							
Volatiles Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Dichlorodifluoromethane	5.0								
Chloromethane	5.0								
Vinyl chloride	5.0								
Bromomethane	5.0								
Chloroethane	5.0								
Trichlorofluoromethane	5.0								
1,1-Dichloroethene	5.0								
1,1,2-Trichloro-1,2,2-trifluoroethane	5.0								
Acetone	10								
Carbon Disulfide	5.0								
Methyl acetate	5.0								
Methylene chloride	5.0	1.4	J						
trans-1,2-Dichloroethene	5.0								
Methyl tert-butyl ether	5.0								
1,1-Dichloroethane	5.0								
cis-1,2-Dichloroethene	5.0								
2-Butanone	10								
Bromochloromethane	5.0								
Chloroform	5.0								
1,1,1-Trichloroethane	5.0								
Cyclohexane	5.0								
Carbon tetrachloride	5.0								
Benzene	5.0								
1,2-Dichloroethane	5.0								
1,4-Dioxane	100		R						
Trichloroethene	5.0								
Methylcyclohexane	5.0								
1,2-Dichloropropane	5.0								
Bromodichloromethane	5.0								
cis-1,3-Dichloropropene	5.0								
4-Methyl-2-pentanone	10								
Toluene	5.0								
trans-1,3-Dichloropropene	5.0								

## DATA SUMMARY FORM: Volatiles

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Case #: 41660

SDG : C0384

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C0384									
Sampling Location :		GW-6									
Field QC:		Trip Blank									
Matrix :		Aqueous									
Units :		ug/L									
Date Sampled :		10/05/2011									
Time Sampled :		11:40									
pH:		1									
Dilution Factor :		1.0									
Volatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,1,2-Trichloroethane	5.0										
Tetrachloroethene	5.0										
2-Hexanone	10										
Dibromochloromethane	5.0										
1,2-Dibromoethane	5.0										
Chlorobenzene	5.0										
Ethylbenzene	5.0										
o-Xylene	5.0										
m,p-Xylene	5.0										
Styrene	5.0										
Bromoform	5.0										
Isopropylbenzene	5.0										
1,1,2,2-Tetrachloroethane	5.0										
1,3-Dichlorobenzene	5.0										
1,4-Dichlorobenzene	5.0										
1,2-Dichlorobenzene	5.0										
1,2-Dibromo-3-chloropropane	5.0										
1,2,4-Trichlorobenzene	5.0										
1,2,3-Trichlorobenzene	5.0										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits:  $(CRQL * Dilution Factor) / [(100 - \%Moisture) / 100]$ 

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## DATA SUMMARY FORM: BNA

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Case #: 41660

SDG : C0384

Number of Soil Samples : 15

Site :

ROCKVILLE LAUNCH

Number of Water Samples : 0

Lab. :

DATAC

Sample Number :		C0389		C0390		C0391		C0395		C0397	
Sampling Location :		S-12		S-13		S-14		S-5		S-7	
Field QC:											
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/05/2011		10/05/2011		10/05/2011		10/05/2011		10/05/2011	
Time Sampled :		09:45		09:20		09:05		10:00		11:15	
%Moisture :		18.0		19.8		20.0		18.4		17.7	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Benzaldehyde	170	84	B	78	B	75	B	95	B	150	B
Phenol	170	21	B	22	B	17	B	22	B	36	B
Bis(2-Chloroethyl)ether	170										
2-Chlorophenol	170										
2-Methylphenol	170										
2,2'-Oxybis(1-chloropropane)	170										
Acetophenone	170	62	B	64	B	57	B	70	B	120	B
4-Methylphenol	170										
N-Nitroso-di-n-propylamine	170										
Hexachloroethane	170										
Nitrobenzene	170										
Isophorone	170										
2-Nitrophenol	170										
2,4-Dimethylphenol	170										
Bis(2-chloroethoxy)methane	170										
2,4-Dichlorophenol	170										
Naphthalene	170			8.5	J						
4-Chloroaniline	170						R				
Hexachlorobutadiene	170										
Caprolactam	170										
4-Chloro-3-methylphenol	170										
2-Methylnaphthalene	170										
Hexachlorocyclopentadiene	170						R				
2,4,6-Trichlorophenol	170										
2,4,5-Trichlorophenol	170										
1,1'-Biphenyl	170										
2-Chloronaphthalene	170										
2-Nitroaniline	330										
Dimethylphthalate	170										
2,6-Dinitrotoluene	170										
Acenaphthylene	170										
3-Nitroaniline	330										
Acenaphthene	170			8.2	J						

## DATA SUMMARY FORM: BNA

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Case #: 41660

SDG : C0384

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C0389		C0390		C0391		C0395		C0397	
Sampling Location :		S-12		S-13		S-14		S-5		S-7	
Field QC:											
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/05/2011		10/05/2011		10/05/2011		10/05/2011		10/05/2011	
Time Sampled :		09:45		09:20		09:05		10:00		11:15	
%Moisture :		18.0		19.8		20.0		18.4		17.7	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-Dinitrophenol	330										
4-Nitrophenol	330										
Dibenzofuran	170										
2,4-Dlnitrotoluene	170										
Diethylphthalate	170							6.6	J		
Fluorene	170										
4-Chlorophenyl-phenylether	170										
4-Nitroanillne	330										
4,6-Dinitro-2-methylphenol	330										
N-Nitrosodiphenylamine	170										
1,2,4,5-Tetrachlorobenzene	170										
4-Bromophenyl-phenylether	170										
Hexachlorobenzene	170										
Atrazine	170										
Pentachlorophenol	330										
Phenanthrene	170			87	J	7.3	J			6.5	J
Anthracene	170			16	J						
Carbazole	170			13	J						
Di-n-butylphthalate	170							6.6	B	7.9	B
Fluoranthene	170			130	J	14	J				
Pyrene	170			130	J	22	J				
Butylbenzylphthalate	170										
3,3'-Dlchlorobenzidine	170						R				
Benzo(a)anthracene	170			65	J	17	J				
Chrysene	170			66	J	10	J				
Bis(2-ethylhexyl)phthalate	170			21	B	26	B	12	B	20	B
Di-n-octylphthalate	170										
Benzo(b)fluoranthene	170			82	J	19	J				
Benzo(k)fluoranthene	170			30	J						
Benzo(a)pyrene	170			51	J	13	J				
Indeno(1,2,3-cd)pyrene	170			45	J	13	J				
Dibenzo(a,h)anthracene	170			14	J						
Benzo(g,h,l)perylene	170			12	J						
2,3,4,6-Tetrachlorophenol	170										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / [(100 - %Moisture) / 100]

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SDG : C0384

## ROCKVILLE LAUNCH

## DATA C

[illegible]

## DATA SUMMARY FORM: BNA

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Case #: 41660

SDG : C0384

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C0398		C0399		C03A0		C03A5		C03A6	
Sampling Location :		S-8		S-9		SD-15		SS-12		SS-13	
Field QC:						Field Dup. of C03B1					
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/05/2011		10/05/2011		10/05/2011		10/05/2011		10/05/2011	
Time Sampled :		10:25		10:45		10:10		09:50		09:30	
%Moisture :		16.2		10.4		17.7		18.6		16.7	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Semivolatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-Dinitrophenol	330										
4-Nitrophenol	330										
Dibenzofuran	170										
2,4-Dinitrotoluene	170										
Diethylphthalate	170			5.9	J						
Fluorene	170										
4-Chlorophenyl-phenylether	170										
4-Nitroaniline	330										
4,6-Dinitro-2-methylphenol	330										
N-Nitrosodiphenylamine	170										
1,2,4,5-Tetrachlorobenzene	170										
4-Bromophenyl-phenylether	170										
Hexachlorobenzene	170										
Atrazine	170										
Pentachlorophenol	330										
Phenanthrene	170										
Anthracene	170										
Carbazole	170										
Di-n-butylphthalate	170	6.7	B	6.6	B	7.2	B	7.2	B	7.1	B
Fluoranthene	170										
Pyrene	170										
Butylbenzylphthalate	170										
3,3'-Dichlorobenzidine	170										R
Benzo(a)anthracene	170										
Chrysene	170										
Bis(2-ethylhexyl)phthalate	170	14	B	12	B	14	B	14	B	10	B
Di-n-octylphthalate	170										
Benzo(b)fluoranthene	170										
Benzo(k)fluoranthene	170										
Benzo(a)pyrene	170										
Indeno(1,2,3-cd)pyrene	170										
Dibenzo(a,h)anthracene	170										
Benzo(g,h,i)perylene	170										
2,3,4,6-Tetrachlorophenol	170										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / [(100 - %Moisture) / 100]

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SDG : C0384

## ROCKVILLE LAUNCH

**DATA C**

[illegible]

## DATA SUMMARY FORM: BNA

Page \_12\_ of \_17\_

Case #: 41660

SDG : C0384

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C03A7		C03B1		C03B3		C03B4		C03B5	
Sampling Location :		SS-14		SS-5		SS-7		SS-8		SS-9	
Field QC:				Field Dup. of C03A0							
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/05/2011		10/05/2011		10/05/2011		10/05/2011		10/05/2011	
Time Sampled :		09:10		10:05		11:20		10:30		10:50	
%Moisture :		16.2		19.1		12.6		15.7		18.9	
Dilution Factor :		1.0		1.0		1.02		0.76		0.75	
Semivolatile Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,4-Dinitrophenol	330										
4-Nitrophenol	330										
Dibenzofuran	170										
2,4-Dinitrotoluene	170										
Diethylphthalate	170										
Fluorene	170										
4-Chlorophenyl-phenylether	170										
4-Nitroaniline	330										
4,6-Dinitro-2-methylphenol	330										
N-Nitrosodiphenylamine	170										
1,2,4,5-Tetrachlorobenzene	170										
4-Bromophenyl-phenylether	170										
Hexachlorobenzene	170										
Atrazine	170										
Pentachlorophenol	330										
Phenanthrene	170										
Anthracene	170										
Carbazole	170										
Di-n-butylphthalate	170	7.6	B	7.8	B	7.7	B	7.8	B		
Fluoranthene	170										
Pyrene	170										
Butylbenzylphthalate	170										
3,3'-Dichlorobenzidine	170						R				
Benzo(a)anthracene	170										
Chrysene	170										
Bis(2-ethylhexyl)phthalate	170	13	B	16	B	12	B	10	B	14	B
Di-n-octylphthalate	170										
Benzo(b)fluoranthene	170										
Benzo(k)fluoranthene	170										
Benzo(a)pyrene	170										
Indeno(1,2,3-cd)pyrene	170										
Dibenzo(a,h)anthracene	170										
Benzo(g,h,i)perylene	170										
2,3,4,6-Tetrachlorophenol	170										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / [(100 - %Moisture) / 100]

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## DATA SUMMARY FORM: Pesticides

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Case #: 41660

SDG : C0384

Number of Soil Samples : 15

Site :

ROCKVILLE LAUNCH

Number of Water Samples : 0

Lab. :

DATAC

Sample Number :		C0389		C0390		C0391		C0395		C0397	
Sampling Location :		S-12		S-13		S-14		S-5		S-7	
Field QC:											
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/05/2011		10/05/2011		10/05/2011		10/05/2011		10/05/2011	
Time Sampled :		09:45		09:20		09:05		10:00		11:15	
%Moisture :		18.0		19.8		20.0		18.4		17.7	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Pesticide Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	1.7										
beta-BHC	1.7	0.16	B					0.12	B		
delta-BHC	1.7							0.31	J	0.57	J
gamma-BHC (Lindane)	1.7										
Heptachlor	1.7										
Aldrin	1.7	0.38	B	0.20	B	0.16	B	0.42	B	0.61	B
Heptachlor epoxide	1.7										
Endosulfan I	1.7										
Dieldrin	3.3										
4,4'-DDE	3.3	0.23	J	0.47	J	0.24	J			5.3	
Endrin	3.3									0.20	B
Endosulfan II	3.3										
4,4'-DDD	3.3									1.7	J
Endosulfan sulfate	3.3										
4,4'-DDT	3.3			1.4	J	0.49	J			4.4	
Methoxychlor	17										
Endrin ketone	3.3			0.093	J					0.52	J
Endrin aldehyde	3.3										
alpha-Chlordane	1.7										
gamma-Chlordane	1.7										
Toxaphene	170										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits:  $(CRQL * Dilution Factor) / [(100 - \%Moisture) / 100]$ 

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+ = Result reported from the diluted analysis.



## DATA SUMMARY FORM: Pesticides

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Case #: 41660

SDG : C0384

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C0398		C0399		C03A0		C03A5		C03A6	
Sampling Location :		S-8		S-9		SD-15		SS-12		SS-13	
Field QC:						Field Dup. of C03B1					
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/05/2011		10/05/2011		10/05/2011		10/05/2011		10/05/2011	
Time Sampled :		10:25		10:45		10:10		09:50		09:30	
%Moisture :		16.2		10.4		17.7		18.6		16.7	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
Pesticide Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	1.7										
beta-BHC	1.7	0.085	B			0.20	B	0.14	B		
delta-BHC	1.7					0.41	J			0.30	J
gamma-BHC (Lindane)	1.7										
Heptachlor	1.7										
Aldrin	1.7	0.15	B	0.19	B	0.34	B	0.32	B	0.33	B
Heptachlor epoxide	1.7										
Endosulfan I	1.7										
Dieldrin	3.3										
4,4'-DDE	3.3	0.52	J	1.3	J						
Endrin	3.3			0.39	B			0.15	B		
Endosulfan II	3.3										
4,4'-DDD	3.3			0.30	J						
Endosulfan sulfate	3.3										
4,4'-DDT	3.3										
Methoxychlor	17										
Endrin ketone	3.3										
Endrin aldehyde	3.3										
alpha-Chlordane	1.7										
gamma-Chlordane	1.7										
Toxaphene	170										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits:  $(CRQL * Dilution Factor) / [(100 - \%Moisture) / 100]$ 

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## DATA SUMMARY FORM: Pesticides

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Case #: 41660

SDG : C0384

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C03A7		C03B1		C03B3		C03B4		C03B5	
Sampling Location :		SS-14		SS-5		SS-7		SS-8		SS-9	
Field QC:				Field Dup. of C03A0							
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/05/2011		10/05/2011		10/05/2011		10/05/2011		10/05/2011	
Time Sampled :		09:10		10:05		11:20		10:30		10:50	
%Moisture :		16.2		19.1		12.6		15.7		18.9	
Dilution Factor :		1.0		1.0		1.02		0.76		0.75	
Pesticide Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
alpha-BHC	1.7										
beta-BHC	1.7	0.12	B	0.16	B	0.13	B	0.18	B	0.14	B
delta-BHC	1.7										
gamma-BHC (Lindane)	1.7										
Heptachlor	1.7									0.087	J
Aldrin	1.7	0.21	B	0.34	B	0.15	B	0.27	B		
Heptachlor epoxide	1.7										
Endosulfan I	1.7										
Dieldrin	3.3										
4,4'-DDE	3.3										
Endrin	3.3										
Endosulfan II	3.3										
4,4'-DDD	3.3										
Endosulfan sulfate	3.3										
4,4'-DDT	3.3										
Methoxychlor	17					1.1	J				
Endrin ketone	3.3					0.36	J			0.16	J
Endrin aldehyde	3.3										
alpha-Chlordane	1.7										
gamma-Chlordane	1.7										
Toxaphene	170										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits:  $(CRQL * Dilution Factor) / [(100 - \%Moisture) / 100]$ 

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## DATA SUMMARY FORM: Aroclor

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Case #: 41660

SDG : C0384

Number of Soil Samples : 15

Site :

ROCKVILLE LAUNCH

Number of Water Samples : 0

Lab. :

DATAC

Sample Number :	C0389	C0390	C0391	C0395	C0397						
Sampling Location :	S-12	S-13	S-14	S-5	S-7						
Field QC:											
Matrix :	Soil	Soil	Soil	Soil	Soil						
Units :	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg						
Date Sampled :	10/05/2011	10/05/2011	10/05/2011	10/05/2011	10/05/2011						
Time Sampled :	09:45	09:20	09:05	10:00	11:15						
%Moisture :	18.0	19.8	20.0	18.4	17.7						
Dilution Factor :	1.0	0.99	0.99	1.0	1.0						
Aroclor Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Aroclor-1016	33										
Aroclor-1221	33										
Aroclor-1232	33										
Aroclor-1242	33										
Aroclor-1248	33										
Aroclor-1254	33										
Aroclor-1260	33										
Aroclor-1262	33										
Aroclor-1268	33										

Sample Number :	C0398	C0399	C03A0	C03A5	C03A6						
Sampling Location :	S-8	S-9	SD-15	SS-12	SS-13						
Field QC:			Field Dup. of C03B1								
Matrix :	Soil	Soil	Soil	Soil	Soil						
Units :	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg						
Date Sampled :	10/05/2011	10/05/2011	10/05/2011	10/05/2011	10/05/2011						
Time Sampled :	10:25	10:45	10:10	09:50	09:30						
%Moisture :	16.2	10.4	17.7	18.6	16.7						
Dilution Factor :	0.99	1.0	1.0	1.0	0.99						
Aroclor Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Aroclor-1016	33										
Aroclor-1221	33										
Aroclor-1232	33										
Aroclor-1242	33										
Aroclor-1248	33										
Aroclor-1254	33										
Aroclor-1260	33										
Aroclor-1262	33										
Aroclor-1268	33										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL \* Dilution Factor) / [(100 - %Moisture) / 100]

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## DATA SUMMARY FORM: Aroclor

Page \_17\_ of \_17\_

Case #: 41660

SDG : C0384

Site :

ROCKVILLE LAUNCH

Lab. :

DATAC

Sample Number :		C03A7		C03B1		C03B3		C03B4		C03B5	
Sampling Location :		SS-14		SS-5		SS-7		SS-8		SS-9	
Field QC:				Field Dup. of C03A0							
Matrix :		Soil		Soil		Soil		Soil		Soil	
Units :		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
Date Sampled :		10/05/2011		10/05/2011		10/05/2011		10/05/2011		10/05/2011	
Time Sampled :		09:10		10:05		11:20		10:30		10:50	
%Moisture :		16.2		19.1		12.6		15.7		18.9	
Dilution Factor :		1.0		1.0		1.02		0.76		0.75	
Aroclor Compound	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Aroclor-1016	33										
Aroclor-1221	33										
Aroclor-1232	33										
Aroclor-1242	33										
Aroclor-1248	33										
Aroclor-1254	33										
Aroclor-1260	33										
Aroclor-1262	33										
Aroclor-1268	33										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits:  $(CRQL * Dilution Factor) / [(100 - \%Moisture) / 100]$ 

Revised 09/99

## Appendix C

### Chain of Custody (COC) Records



## **APPENDIX D – TOXICOLOGICAL EVALUATION**



**Rockville Nike Launch Facility  
Gaithersburg, Montgomery County, Maryland  
Toxicological Evaluation**

### Summary

This toxicological evaluation examines the human health risks associated with the Cumberland Gas & Light site in Cumberland, Allegany County, Maryland. This site was evaluated for child visitor (1-6 years), youth visitor (6-17), adult worker and construction worker populations under a commercial future use scenario. This toxicological evaluation evaluates risks to commercial use populations only. Commercial use scenarios are expected to have lesser levels of risk and should be evaluated to reflect appropriate land use scenarios. The United States Environmental Protection Agency (EPA) has recommended default exposure parameters that were used to estimate cumulative risk from all chemicals (4, 5, 6, 7 and 8). EPA recognizes as an acceptable Hazard Index (HI) values less than or equal to 1 (noncarcinogenic chemicals) and excess lifetime cancer risk (CR) less than or equal to  $10^{-6}$  to  $10^{-4}$ . The Maryland Department of the Environment (MDE) recognizes as an acceptable HI values less than or equal to 1 and excess lifetime cancer risk less than or equal to  $10^{-6}$  to  $10^{-5}$ . Risks to ecological receptors were not evaluated for this site. Based on these exposures, estimated risks at the site were compared to MDE and EPA recommended levels, and the following conclusions were reached:

**Summary table of Hazard Indices (HI) values and Cancer Risk (CR) values  
for each commercial population**

Noncarcinogenic Endpoints Detected Contaminants Only			
Population	Pathway	Hazard Index	Risk Drivers
Child visitor	Ingestion-surface soil	2	Potential additive effects
Carcinogenic Endpoints Detected Contaminants Only			
Population	Pathway	Cancer Risk	Risk Drivers
Child visitor	NA	NA	NA
Youth visitor	NA	NA	NA
Adult worker	NA	NA	NA
Construction worker	NA	NA	NA

NA = Not applicable; no carcinogenic exposure pathway exceeded a cancer risk of  $1 \times 10^{-5}$  for detected contaminants on site.

**Summary table of Hazard Indices (HI) values and Cancer Risk (CR) values  
for each commercial population utilizing 95% UCL concentrations (soil only)**

**Noncarcinogenic Endpoints Detected Contaminants Only**

<b>Population</b>	<b>Pathway</b>	<b>Hazard Index</b>	<b>Risk Drivers</b>
Child visitor	NA	NA	NA
Youth visitor	NA	NA	NA
Adult worker	NA	NA	NA
Construction worker	NA	NA	NA

**Carcinogenic Endpoints Detected Contaminants Only**

<b>Population</b>	<b>Pathway</b>	<b>Cancer Risk</b>	<b>Risk Drivers</b>
Child visitor	NA	NA	NA
Youth visitor	NA	NA	NA
Adult worker	NA	NA	NA
Construction worker	NA	NA	NA

NA = Not applicable; no noncarcinogenic or carcinogenic exposure pathways exceeded a Hazard Index of one or a cancer risk of  $1 \times 10^{-5}$  for detected contaminants on site.

## Site Description

The Rockville Nike Launch Facility operated from 1955 through 1974 at the location off Muddy Branch Road near Gaithersburg, Montgomery County, Maryland. This report references the site as Rockville W-92. Following base closure in 1974, the site was turned over to the Consumer Product Safety Commission and later, to the National Institute of Standards and Technology. Currently, the Nike launch site is owned by the U.S. Federal Government. The United State Army Corps of Engineers (USACE) has investigated the site under the formerly used defense site (FUDS) initiative. Portions of the site were remediated under USACE oversight. Monitoring well sampling at the Rockville Launch site revealed significant levels of chlorinated solvents in on-site monitoring wells. Samples of site soils found elevated levels of metals and poly-aromatic hydrocarbons (PAH) in some on site locations. The NIKE missile launch site is a testament to the Cold War era. "Rockville W-92" was a guided missile base installed to help defend the Nation's Capital from enemy bombers. Built in 1954, the missile launch site located west of Muddy Branch Road, housed both NIKE Ajax and Hercules missiles. The launch site contains three missile silos and a collection of barracks and out-buildings. The Nike site remained operational until 1974, when rendered obsolete by the refinement of intercontinental ballistic missiles.

In the early years of the Cold War, the United States Army set up a battery of Nike missile defense systems around forty major US cities. The typical Nike base consisted of two operational areas: the launch area and the fire control area. The launch area contained the facilities and equipment required to assemble, test and maintain the missiles and associated launch mechanisms. The fire control area, located on MD-RT 28 about 1-mile from the launch area, consisted of radar and telemetry arrays and a command area that initiated launch and controlled the flight of the missile. This report deals exclusively with the launch area. Normal operations at a Nike launch facility included the use and on-site disposal of solvents, fuels, battery acids, hydraulic fluids, paints and other materials necessary to support the mission. Contaminants normally associated with a Nike launch site include petroleum compounds, carbon tetrachloride and associated degreasing agents, red fuming nitric acid, lead based paints, asbestos containing materials, polychlorinated biphenyls, pesticides and heavy metals.

There are generally several underground storage tanks (UST) and at least two dry wells normally associated with a Nike Launch facility. At the Rockville site there were three USTs and two dry wells. The USTs were located behind the barracks building, the missile assembly building and the machine shop. One dry well was associated with the rocket cleaning and assembly building and a second dry well was associated with the rocket fueling facility. Waste from the cleaning and assembly building included chlorinated solvents, such as TCE and carbon tetrachloride, as well as petroleum compounds and associated degreasing agents. Wastes associated with the fueling operations included red fuming nitric acid and solid fuel propellants.

The address for Rockville Launch (MD-226) was 770 Muddy Branch Road, Gaithersburg, MD 20878. The geographic coordinates for the site are 039 degrees 7 minutes 00.72 seconds north latitude by 077 degrees 13 minutes 11.43 seconds east longitude. The Maryland grid coordinates are 467,000 north by 738,000 east.



The Rockville Nike Launch site has been the subject of several previous investigations.

In September 1988, Woodward-Clyde Consultants (WCC) conducted a Confirmation Study at the site. The results of this study identified the presence of trichloroethene (TCE) in the sample collected from groundwater monitoring well MW-4 at a concentration of 0.021 milligrams per liter (mg/L). In addition, elevated total petroleum hydrocarbons (TPH) (1,100 milligrams per kilogram [mg/kg]) and elevated metals (copper, lead, nickel, zinc, and magnesium) were identified in the soils on the northwest portion of the site. The elevated metals concentrations were attributed to the presence of paint chips and other debris that was noted in the soil sample. The report recommended the removal of three underground storage tanks (USTs) from the site.

EA Engineering and Science, Inc. (EA) conducted a site investigation on December 27, 1989, which found that the three USTs were removed by the property owner, the National Institute of Standards and Technology (NIST).

In 1994 the United States Army Corps of Engineers (USACE), Omaha District, completed a limited groundwater investigation. Results of this investigation identified the presence of TCE in the sample collected from MW-4 at a concentration of 0.017 mg/L.

In September 1997 USACE performed a DERP Inventory Screening to Determine DOD responsibility for environmental and safety conditions at the former Nike missile battery.

On October 31, 2000, the United States Environmental Protection Agency (USEPA), Superfund Technical Assessment and Response Team (START) collected groundwater and soil samples from across the site. Results of this investigation identified the presence of TCE in the sample collected from MW-4 at a concentration of 0.0008 mg/L. However, it was noted that several of the sample bottles contained bubbles and that these bubbles may have been caused by a reaction between the water sample, sediment in the sample, and the sample preservative. The report noted that the detected concentration in the sample collected from MW-4 may not accurately reflect the true concentration of TCE at this monitoring well. Soil samples were also collected from the northwest portion of the site by the USACE as part of this investigation and analyzed for TPH and lead. TPH was not detected in any of the samples, and lead was reported to have been detected within the natural limits for lead in soils in the eastern part of the United States. Furthermore, one of the samples was also analyzed for leachable lead per the toxicity characteristics leaching procedure (TCLP). The results of the TCLP lead analysis indicated that the concentration of leachable lead in the soils was below the current regulatory value of 5 mg/L.

In September 2002, the USACE Baltimore District collected a groundwater sample from monitoring well MW-4 to confirm that the TCE concentration was below the MDE Maximum Contaminant Level (MCL) of 0.005 mg/L. The analytical results for this sampling event indicated that no TCE was detected in the sample at or above the laboratory detection limit of 0.0014 mg/L.

In November 2007 ARM Group, Inc. performed a Site Characterization and Risk Assessment on the site for the town of Gaithersburg. The soil gas investigation identified TCE at levels above the EPA Vapor Intrusion Guidance Criteria of 2.2 ug/m<sup>3</sup> in three of five samples. Wipe samples from the missile silos detected PCBs above detection limits. The report also documents a July 2007 investigation that confirmed no TCE contamination in MW-4. As a result of this investigation USACE abandoned MW-2, MW-3 and MW-4.

In March 2008 ARM Group, Inc. performed an Indoor Air Sampling on the site for the town of Gaithersburg. Two ambient air and two soil gas samples were collected. ARM concluded that the VOCs found in soil do not present an unacceptable hazard. Contaminants found in ambient samples were not at levels significantly above anticipated indoor air background.

In October 2011 MDE conducted a FUDS SI of the Rockville Launch site to identify soil and groundwater contamination and to determine if further vapor intrusion studies were warranted.

## **1.0 Method**

In evaluating risk to human health, maximum concentrations of all chemicals detected in soil were compared to medium-specific screening levels (EPA Regional Screening Level Table values and Maryland Department of the Environment Cleanup Standards (1, 2)). Chemicals that exceeded human health Regional Screening Level (RSL) values were then evaluated quantitatively. Relevant toxicological data and RSL values from surrogate compounds (structurally similar analogues) were used for some of the chemicals with no corresponding RSL value. No groundwater data were collected from the site. The evaluation of groundwater exposure pathways was not performed. Soil samples were collected from locations on the property.

### **1.1 Human Health**

Maximum concentrations of all chemicals detected in soil (dry weight values) were compared to the EPA Regional Screening Level (RSL) table values for residential soil (1). Comparison of dry weight analytical values to the RSLs is recognized as a conservative measure but provides consistency in risk assessments across sites (with variable soil moisture content) and sampling time. Prior to comparison with each chemical concentration, noncarcinogenic RSLs were multiplied by 0.1, in order to account for any additivity of systemic effects. Carcinogenic RSL values were not adjusted and represent a target risk level of 10<sup>-6</sup>. Carcinogenic and noncarcinogenic risk levels for all contaminants that exceeded their respective RSL screening level were evaluated quantitatively. The quantitative evaluation was based on expected future use and development scenarios and includes populations typically expected to frequent the site based on this proposed future use. For those soil contaminants identified as potential risk drivers 95% upper confidence limit (95% UCL) values were calculated when a sufficient number of samples (ten per soil horizon) were collected (3).

The future land use at the site was assumed to be commercial; therefore, the commercial exposure scenario was used to evaluate risk at the site. The contaminants identified at the site at

concentrations that exceeded residential RSLs were further evaluated with regard to risk to relevant populations under the following scenarios (4, 5, 6, 7 and 8):

Commercial Development:

Soil:

Adult Worker: 70 kg body weight, 3280 cm<sup>2</sup> skin surface area (soil), 250 days per year exposure for soil ingestion, 50 mg soil ingested per day, 8 hours inhalation, 0.07 mg/cm<sup>2</sup>-event soil to skin adherence factor, 1 m<sup>3</sup>/hour inhalation rate, 25-year exposure duration, 70-year lifetime.

Construction Worker: 70 kg body weight, 3280 cm<sup>2</sup> skin surface area (soil), 0.3 mg/cm<sup>2</sup>-event soil to skin adherence factor, 250 days per year exposure for soil ingestion, 480 mg soil ingested per day, 1.5 m<sup>3</sup>/hour inhalation rate, 8 hour exposure time (inhalation soil), 1 year exposure duration, 70 year lifetime.

Youth (6 - 17 years) Visitor: 40 kg body weight, 4320 cm<sup>2</sup> skin surface area (soil), 0.2 mg/cm<sup>2</sup>-event soil to skin adherence factor, 132 days per year soil ingestion, 100 mg soil ingested per day, 0.56 m<sup>3</sup>/hour inhalation rate, 4 hours inhalation exposure, 12 year exposure duration, 70 year lifetime.

Child (1 - 6 years) Visitor: 15 kg body weight, 2350 cm<sup>2</sup> skin surface area (soil), 0.2 mg/cm<sup>2</sup>-event soil to skin adherence factor, 132 days per year soil ingestion, 200 mg soil ingested per day, 0.32 m<sup>3</sup>/hour inhalation rate, 4 hour inhalation exposure, 6 year exposure duration, 70 year lifetime.

## 2.0 Human Health Evaluation

Soil samples were analyzed for metals, select pesticides and herbicides, PCBs, semi-volatile organic compounds (SVOCs) and volatile organic compounds (VOCs). Chemicals that were detected on site were compared to medium-specific screening levels (EPA RSL values). Chemicals that were not detected at the site and exceeded RSL values (at an assumed concentration of one half the detection level) were carried through the quantitative risk assessment and were included in the summation of noncarcinogenic hazard quotients and carcinogenic cancer risk values for comparative purposes only. Chemicals detected at the site that exceeded human health RSL values were evaluated quantitatively using the maximum detected concentration as the site-wide average concentration.

The EPA has issued a directive for lead that recommends a soil screening level of 400 mg/kg for residential scenarios at RCRA facilities and CERCLA sites; the 400-mg/kg soil screening level was used in this evaluation for soil (9). MDE has a nonresidential lead cleanup standard of 1000 mg/kg. The 400 mg/kg residential screening level and 1000 mg/kg MDE soil cleanup standard were used in this evaluation.

## **2.1 Soil**

Soil samples were analyzed for metals, select pesticides and herbicides, PCBs, VOCs and SVOCs. Contaminants that were detected above their respective residential soil RSLs (i.e. failed the initial screening process, see Attachment A) were evaluated quantitatively. Surface and subsurface soil exposures were evaluated via the ingestion, inhalation, dermal contact and vapor intrusion of volatiles to indoor air pathways. Reference dose (RfD) and cancer slope factor (CSF) values were obtained from EPA Regional Table and IRIS (1, 9). Estimates of noncarcinogenic and carcinogenic risks from dermal contact were calculated when sufficient data (permeability constants (10), oral absorption efficiencies and dermal absorption factors (11)) were available.

## **2.2 Groundwater**

No groundwater data were collected from the site. The evaluation of groundwater exposure pathways was not performed.

## **2.3 Vapor Intrusion**

All volatile and semivolatile contaminants detected in soil on site were quantitatively evaluated for vapor intrusion using the Johnson and Ettinger Tier I vapor intrusion model (12).

## **2.4 MDE Cleanup Standards Screen**

All soil samples collected on site were compared to the MDE *State of Maryland Department of the Environment Cleanup Standards for Soil and Groundwater Interim Final Guidance*, June 2008 (2).

## **3.0 Conclusion**

### **3.1 Soil**

The estimated risks from the incidental ingestion of detected and nondetected noncarcinogenic surface soil contaminants were below MDE and EPA recommended risk levels for all commercial populations (Table 1) using the maximum detected concentrations as the site-wide average concentrations. The estimated risks from the incidental ingestion of detected carcinogenic surface soil contaminants were within MDE and EPA recommended risk ranges for all commercial populations (Table 2) using the maximum detected concentrations as the site-wide average concentrations. Noncarcinogenic risk estimates for the incidental ingestion of detected subsurface soil contaminants exceeded MDE and EPA recommend risk levels for the child visitor commercial population (Table 3) using the maximum detected concentrations as the site-wide average concentrations. Potential additive effects were the noncarcinogenic incidental ingestion risk drivers. Noncarcinogenic risk estimates for the incidental ingestion of detected subsurface soil contaminants were below MDE and EPA recommend risk levels for the youth visitor, adult worker and construction worker commercial populations using the maximum detected concentrations as the site-wide average concentrations. Noncarcinogenic risk estimates

for the incidental ingestion of detected subsurface soil contaminants were below MDE and EPA recommend risk levels for all commercial populations (Table 3UCL) using the 95% UCL concentrations as the site-wide average concentrations. The estimated risks from the incidental ingestion of detected carcinogenic subsurface soil contaminants were within MDE and EPA recommended risk ranges for all commercial populations (Table 4) using the maximum detected concentrations as the site-wide average concentrations.

The estimated noncarcinogenic and carcinogenic risks from the inhalation of detected and nondetected volatiles and fugitive dust from surface and subsurface soils were within acceptable levels as recommended by MDE and EPA for all commercial populations (Tables 5 through 8) using the maximum detected concentrations as the site-wide average concentrations.

Risk estimates for dermal exposure to detected and nondetected noncarcinogenic surface soil contaminants were below MDE and EPA recommended risk levels for all commercial populations (Tables 9 through 12) using the maximum detected concentrations as the site-wide average concentrations.

The maximum concentration of lead detected in soils on site, was less than 400 mg/kg residential and 1000 mg/kg MDE nonresidential soil screening values. Based upon these results, lead contamination in should not pose a threat to the health of sensitive populations and the environment.

### **3.2 Groundwater**

No groundwater data were collected from the site. The evaluation of groundwater exposure pathways was not performed. No groundwater wells are located within ½-mile of the site and public water and sewer services are provided to the site.

### **3.3 Vapor Intrusion**

The risk from subsurface vapor intrusion of detected volatile contaminants in soil into buildings was evaluated using the Johnson and Ettinger vapor intrusion model (Attachment B). One detected contaminant in soil, mercury, exceeded a Hazard Index (HI) of one from vapor intrusion to indoor air, however, the mercury 95% UCL concentration on site was less than the mercury anticipated typical concentration for eastern and central Maryland. Based upon this fact mercury vapor intrusion was not considered further on site. No detected contaminant in soil exceeded a cancer risk of  $1 \times 10^{-5}$  from vapor intrusion to indoor air.

### **3.4 MDE Cleanup Standards Screen**

Maximum concentrations of all chemicals analyzed for in soil were compared to their corresponding MDE non-residential cleanup standard (Attachment A). One detected soil contaminant, arsenic, exceeded its MDE non-residential soil cleanup standard. All contaminants that exceeded their respective non-residential cleanup standard and all detected volatile contaminants were evaluated quantitatively.



### 3.5 Evaluation Assumptions

When determining whether an increased risk to human health exists at this site, it is important to understand that this evaluation was prepared as a first level screening evaluation. Many conservative assumptions are included in this evaluation, which were developed with the understanding that if the estimated risk, using the conservative assumptions, does not exceed EPA's recommended levels, then the risk estimated using more realistic scenarios will not exceed these levels.

Since this evaluation includes many conservative assumptions, a risk that exceeds EPA's recommended level of risk does not necessarily indicate an increased risk to human health. When this situation occurs, it is necessary to consider several points when determining if the risk actually does represent a threat to human health. For example, the quantitative risk estimate in this evaluation assumes people will be exposed to a contaminant at the maximum concentration all throughout the site and for the entire exposure duration. These assumptions do not take into account whether the maximum concentration is anomalous or characteristic of the site, or that biodegradation, dispersion, dilution, or other factors may decrease the contaminant concentration throughout the time of exposure.

This evaluation also assumes that the bioavailability of each contaminant is 100 percent, and that all of the contaminant taken into the body is absorbed across the digestive tract into the body. A chemical is harmful to human health only if it is absorbed into the body. Assuming complete bioavailability does not consider the fact that it is common for a fraction of the chemical taken into the body to be excreted rather than absorbed into the body. The bioavailability of a contaminant is dependent on many factors, such as the state or form of the contaminant and if the actual size of the contaminant particle would permit incidental ingestion. These issues must be considered when evaluating the appropriateness of assuming total bioavailability of a contaminant.

#### 4.0 References

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4. EPA. 1989. *Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A) Interim Final*. Office of Emergency and Remedial Response. EPA/540/1-89/002.
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8. EPA. 1997. *Exposure Factors Handbook, Volume I, General Factors*. Office of Research and Development. EPA/600/P-95/002Fa.
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12. EPA. Region III, 1995. *Technical Guidance Manual, Risk Assessment, Assessing Dermal Exposure from Soil*. EPA/903-K-95-003.
13. EPA. *User's Guide for the Johnson and Ettinger (1991) Model for subsurface Vapor Intrusion into Buildings*. Version 3.1; 02/04.